Fukushima-is-still-news

- vol. 6 –

Reprocessing, Storage of Nuclear Waste, Decommissioning

Odile Girard

Référence bibliographique
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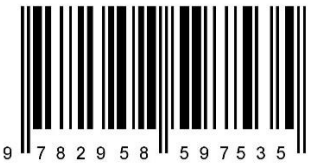

INTRODUCTION

J'ai « découvert » l'écologie au début des années 70, croisant dans le même temps la pollution, les luttes paysannes et la malbouffe, la médecine qui avait (déjà) perdu son âme, les mouvements sociaux et bien sûr le nucléaire qui a occupé une grande partie de ma vie.

Après la catastrophe de mars 2011 au Japon, j'ai suivi chaque jour une partie des grands journaux japonais anglophones pour essayer de sauvegarder un maximum d'articles ayant trait à Fukushima. L'idée était de conserver une sorte d'archive accessible à tous, qu'ils soient écrivains, journalistes ou tout simplement intéressés.

Le blog « Fukushima-is-still-news » a été poursuivi jusqu'en 2019. Ci-dessous, la conclusion parue le jour où j'ai décidé d'arrêter mon blog.

End of March 2019: Time to stop this blog
29 Mars 2019
Rédigé par fukushima-is-still-news et publié depuis Overblog

I have been collecting and spreading information on the Fukushima disaster for more than 8 years.
More than ever I am convinced that the name of my blog « Fukushima-is-still-news » was aptly chosen. Or perhaps i should have called it « Fukushima should still be news ». What i'm getting at is that i know the disaster is going on and we cannot simply forget Fukushima and turn the page. But the mode of action I chose 8 years ago has its limits and it is time for me to stop this blog.
I don't want the contents to be lost, so I will try and publish the lot with the Éditions de Fukushima so that the information remains available online.
Good bye for now. I am not doing a disappearing act. I'm still there tracking what's going on in the world of nukes.

C'est maintenant chose faite. Le blog *fukushima-is-still-news* est désormais disponible aux Éditions de Fukushima. Une fois de plus merci à mon ami Pierre, qui m'a convaincue à l'époque de tenir ce blog et m'a aidée à le lancer.

Odile Girard

Explication des différentes couleurs de texte utilisées :	*Why different colours in the print ?*
• *Tous les titres originaux (issus pour la plupart des journaux japonais) sont en noir.* • *Les titres qui apparaissent en bleu sont des résumés de l'article/des articles suivant(s).* • *Les parties en rouge représentent des infos particulièrement intéressantes ou révélatrices.*	• *All the original titles (from the Japanese newspapers for the most part) are in black.* • *Some extra titles appear in blue: they are an attempt to summarise the following article(s).* • *Whatever appears in red in the text underlines some information I found particularly interesting or revealing.*

Le présent volume est le sixième d'une collection de 16 ouvrages qui sont édités petit à petit.

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Reprocessing

April 19, 2012

Reprocess or not? A question of cost

Reprocessing spent nuclear fuel would cost more than burying part of it

http://mainichi.jp/english/english/newsselect/news/20120419p2a00m0na014000c.html

Reprocessing the entire amount of spent nuclear fuel generated at nuclear power plants across Japan would cost more than burying part of such fuel underground, an estimate by the Japan Atomic Energy Commission (JAEC) has shown.

A subcommittee to JAEC, which is tasked with reviewing the country's nuclear fuel cycle policy, revealed the estimate on April 19. The subcommittee calculated the total project costs for disposing of spent nuclear fuel by 2030 and concluded that the so-called concurrent method -- in which spent nuclear fuel is reprocessed while partially disposed of underground if nuclear power plants remain in operation -- would cost the least.

It is the first time that a government body has presented the estimated costs for the nuclear fuel cycle in accordance with different policy patterns in the future, including a departure from nuclear power generation. Based on the calculation, the subcommittee will file a report on the estimates and their feasibility with the government's Energy and Environment Council as early as in May so they could serve as a policy option. The council is then expected to reflect the estimates in its medium- and long-term energy strategy.

The subcommittee calculated the operational costs for each of the three methods -- (a) reprocessing the entire amount of spent nuclear fuel; (b) directly disposing of the entire volume of such fuel; and (c) combined use of the aforementioned two methods. The cost for the (b) method includes expenses for decommissioning a reprocessing plant.

The subcommittee then compared the estimated costs depending on the following three energy source patterns -- (1) the ratio of nuclear power generation in the country's electricity output is 35 percent in 2030; (2) 20 percent in 2030; and (3) 0 percent in 2020.

As a result, it was found that in patterns (1) and (2), using the (c) method will cost the least at 8.1 trillion yen to 9.1 trillion yen, with spent nuclear fuel reprocessed at the Rokkasho Reprocessing Plant in Aomori Prefecture while part of such fuel is directly disposed of. The cost is cheaper than applying the (a) method -- in which the entire amount of spent nuclear fuel is recycled at a cost of 8.3 trillion to 9.7 trillion yen -- or the (b) method -- in which the entire volume of such fuel is directly disposed of at a cost of 10.3 trillion to 11.9 trillion yen, according to the subcommittee. The subcommittee explained that the (c) method would cost the cheapest because it does not require the expenses to decommission a reprocessing plant and because the cost for reprocessing spent fuel is cheaper than the (a) method.

In the meantime, if pattern (3) -- in which Japan breaks away from nuclear power generation -- becomes true, it will only cost 6.7 trillion to 7.1 trillion yen for directly disposing of the entire amount of spent nuclear fuel, because the amount of spent nuclear fuel generated at nuclear power plants will be reduced and because there will no longer be the necessity to reprocess spent nuclear fuel.

In either of the patterns, the cost for the (b) method -- directly disposing of the entire amount of spent fuel -- includes 4.7 trillion yen as the cost for a "policy change," such as decommissioning the Rokkasho Reprocessing Plant and a mixed-oxide (MOX) fuel plant planned by Japan Nuclear Fuel Ltd. If that cost is excluded, the (b) method will cost significantly cheaper than other disposal methods regardless of whichever of the three energy policy patterns is adopted, at 2 trillion to 6.9 trillion yen.

April 20, 2012

Not much to do with cost, in fact

Despite cost, adherence to gov't nuclear fuel reprocessing policy still seen

http://mainichi.jp/english/english/newsselect/news/20120420p2a00m0na025000c.html

Estimates released April 19 by the Japan Atomic Energy Commission (JAEC) have shown that the government's policy of reprocessing all spent nuclear fuel generated at nuclear power plants across Japan would cost more than burying a portion of the fuel underground. Yet a number of government and nuclear power plant officials remain firmly attached to the policy of reprocessing fuel, and the barriers to changing the nation's policy on fuel reprocessing are high.

A feature of the latest estimates from a JAEC subcommittee is that the "concurrent" method of partially reprocessing and partially burying spent nuclear fuel was deemed to be the cheapest as long as nuclear power plants remained in operation, while directly disposing of all spent fuel would be the cheapest method if all nuclear power plants were to cease operation in Japan by 2020. The conclusions indicate that a path for directly disposing of spent nuclear fuel could be opened.

Under the estimates, 5 trillion yen to cover the decommissioning of the Rokkasho Reprocessing Plant in Aomori Prefecture and other expenses have been added to the costs of disposing of all spent nuclear fuel. Because of this, complete disposal has been deemed economically disadvantageous as long as nuclear power plants are still operating in Japan.

Hideyuki Ban, a committee member who serves as a joint representative of the Citizens' Nuclear Information Center, commented, "Unless we look carefully at how the calculations were made, we can't judge whether they are appropriate or not. The conclusions indicate that the there is still an attachment (within the government) to the stalled nuclear fuel cycle."

Cost is not the only factor in the attachment to the reprocessing cycle. Supposing the ratio of nuclear power to the total amount of electric power generated in Japan stood at 20 percent by 2030, reprocessing instead of disposing of spent nuclear fuel would result in a 15 percent saving in uranium fuel, and stockpiles of fissile uranium which are restricted under international rules (amounting to about 30 tons) would decrease from 2030 onwards. This gives the reprocessing model the upper hand.

One reason the government and power suppliers have stuck firmly to reprocessing is that stockpiles of spent nuclear fuel continue to build up at nuclear power plants. As of September last year, there were a total of 14,200 tons of spent fuel onsite at Japan's 54 reactors, including four Tokyo Electric Power Co. reactors which were officially decommissioned on April 19. **Unless this "nuclear waste" is dealt with, nuclear power plants may have to cease operations. But even if a decision is made to directly dispose of spent fuel, the issue of finding a disposal site must still be addressed.**

The estimates produced by the JAEC subcommittee will be reflected in a mid- to long-term energy strategy to be compiled by the government's Energy and Environment Council, while taking feasibility issues into consideration. But it remains to be seen whether the government's line of reprocessing spent fuel will be changed. When the outline for Japan's current nuclear power strategy was compiled in 2005, direct disposal of spent fuel was calculated to be about 10 percent cheaper than reprocessing it, but after a general evaluation, the line of reprocessing all nuclear fuel was adopted.

Subcommittee member Hidenori Oda, a member of the JAEC subcommittee who serves as head of the nuclear power division of the Federation of Electric Power Companies of Japan, called for maintaining the status quo.
"The selection of a reprocessing site was sought earnestly together with a local body involved (the Aomori Prefectural Government). A policy change would negate this," he said.

Tatsujiro Suzuki, who presides over the subcommittee, told reporters after the subcommittee's meeting, "**Rather than cost, the issues of spent nuclear fuel stockpiles and the influences a policy change would have on local bodies are more important.**"

May 8, 2012

Reprocessing momentarily suspended?

Japan gov't proposes postponing decision on nuclear fuel cycle policy

http://mainichi.jp/english/english/newsselect/news/20120508p2g00m0dm126000c.html

TOKYO (Kyodo) -- The government proposed Tuesday to a subpanel of the Japan Atomic Energy Commission carrying over a policy decision on the country's nuclear fuel cycle or temporarily suspending the operation of the used nuclear fuel reprocessing plant in northeastern Japan, officials said.

The secretariat of the five-member commission, which supervises the country's nuclear policy, filed the proposal as the outlook for the operation of existing reactors and development of fast breeder reactors has become unclear following the Fukushima nuclear crisis.

The subpanel, which aims to compile options for the nuclear fuel cycle policy as an input for the government's basic energy strategy to be adopted around summer, will deepen discussions on the country's nuclear policies on the basis of the proposal, the officials said.

Under the proposal, Japan Nuclear Fuel Ltd.'s used fuel reprocessing plant in the village of Rokkasho, Aomori Prefecture, on the northern tip of Japan's largest main island of Honshu, will be limited to test operations or be suspended.

Gov't to decide whether to keep reprocessing spent nuclear fuel

http://mainichi.jp/english/english/newsselect/news/20120508p2g00m0dm016000c.html

TOKYO (Kyodo) -- The government plans to decide within several years whether to continue processing spent nuclear fuel to extract plutonium, government officials said Monday.

Japan has for years adopted a policy to reprocess all spent nuclear fuel for the sake of energy security. But maintaining that policy is increasing difficult, a senior official said.

So the government plans to study the feasibility of burying spent nuclear fuel underground as an option, the officials said.

Specifically, the government will take several years to analyze reprocessing operations, centered on the plant in the village of Rokkasho in Aomori Prefecture. It will look at the technological practicality, cost, planned consumption and protection of extracted plutonium.

The government will also review the fast-breeder reactor technology seen as the core of Japan's nuclear fuel cycle policy, the officials said. A fast-breeder reactor is designed to produce more nuclear fuel than it consumes.

September 13, 2012

Reprocessing to go on?

almost the same article in both papers (based on Kyodonews)

Japan to maintain plan to seek spent fuel reprocessing at Rokkasho

http://mainichi.jp/english/english/newsselect/news/20120913p2g00m0dm084000c.html

TOKYO (Kyodo) -- Japan will continue to seek reprocessing of spent nuclear fuel in the village of Rokkasho in Aomori Prefecture under its new energy strategy to be compiled soon, sources close to the matter said Thursday.

The latest development suggests the government intends to shelve decision making on how to change its current spent fuel recycling policy in a way that would be consistent with the goal of ending nuclear power generation.
In a draft of the energy strategy, obtained by Kyodo News, the government says it will make every effort to break away from nuclear power generation in the 2030s.

The government is making arrangements to send Economy, Trade and Industry Minister Yukio Edano to the northeastern prefecture, which hosts a reprocessing plant and other facilities crucial to achieving fuel recycling, to explain the strategy, the sources said.

The reprocessing plant in Rokkasho has not yet started full-scale operation amid repeated problems, despite nearly 20 years having passed since the beginning of its construction.

For decades, Japan has upheld a policy to seek to reprocess all spent fuel from nuclear power plants and reuse the extracted plutonium and uranium as reactor fuel. If it decides to end nuclear power generation, there would be no point in pursuing such recycling.

But backing away from the current policy is certain to create a backlash from the prefecture and the village, as they have made it clear that they do not want to keep the used fuel brought in from nationwide nuclear complexes unless it could be reprocessed.

Unable to fully operate the Rokkasho plant, Japan has sent spent fuel to France and Britain for reprocessing and accepted vitrified high-level radioactive waste created in the process in another facility in the same village.

But a policy change may lead the village to refuse the entry of such waste and Britain has called on the Japanese government to make sure that the waste would be accepted, the sources said.

Chief Cabinet Secretary Osamu Fujimura said he met British Ambassador to Japan David Warren on Tuesday and promised that the country will "not undermine the relationship of trust."

The industry ministry said it will send senior vice industry minister Seishu Makino to Fukui Prefecture to explain about the envisioned energy strategy.

The prefecture hosts about a dozen reactors in addition to the Monju prototype nuclear fast-breeder reactor, which is seen as playing a central role in Japan's so-called fuel cycle policy.

Nuclear recycling program to continue amid looming storage crisis

Kyodo
http://www.japantimes.co.jp/text/nn20120914a1.html

The government, under its new energy goal of ending the nation's dependence on atomic power by the 2030s, will nonetheless continue to pursue the reprocessing of spent nuclear fuel in the village of Rokkasho, Aomori Prefecture, sources said Thursday.

The latest development suggests the government intends to delay any decision to scale back its current program of recycling spent nuclear fuel, despite its new goal of ending atomic power.

In a draft of the energy strategy, the government says it will make every effort to break away from nuclear power by the 2030s.

The government is arranging to send Minister of Economy, Trade and Industry Yukio Edano to Aomori Prefecture, which hosts the spent-fuel reprocessing plant and other facilities crucial to recycling and storing nuclear fuel, to explain the strategy, the sources said.

The fuel reprocessing plant in Rokkasho, whose construction started nearly 20 years ago, has not yet started full-scale operations due to repeated problems.

For decades the government has been pushing the reprocessing of all spent fuel from the nation's nuclear plants and the reuse the extracted plutonium and uranium as reactor fuel. If the nuclear power program ends, there would be no reason to pursue fuel recycling.

But backing away from the recycling program would prompt Rokkasho and Aomori to demand that the nation's nuclear plants retrieve their spent fuel and store it at their own facilities, many of which are already nearing capacity.

Because the Rokkasho plant is not fully operational, the nation has sent spent fuel to France and Britain for reprocessing and accepted at another facility in the village vitrified high-level radioactive waste created in the processing overseas.

If the recycling program is halted, Rokkasho may refuse to receive such waste and Britain has called on the government to make sure Japan will accept it, the sources said.

Chief Cabinet Secretary Osamu Fujimura said he met British Ambassador David Warren on Tuesday and promised that the country will "not undermine the relationship of trust." The industry ministry said it will send senior vice industry minister Seishu Makino to Fukui Prefecture to explain the new energy strategy.

The prefecture hosts about a dozen reactors in addition to the trouble-plagued Monju prototype fast-breeder reactor, which was to have played a key role in the fuel-cycle policy had it ever been able to be brought online, but now looks to be decommissioned after a few tests are carried out for research.

November 11, 2012

S.Korea not interested in reprocessing its fuel in Japan

S. Korean nuke expert negative about int'l fuel recycling at Rokkasho

http://mainichi.jp/english/english/newsselect/news/20121111p2g00m0dm003000c.html

TOKYO (Kyodo) -- A South Korean nuclear expert has expressed a negative view about a plan to reprocess spent nuclear fuel from his country at a plant in the Aomori Prefecture village of Rokkasho, out of concern over nuclear proliferation.

Chang Soon-heung, professor at the Korea Advanced Institute of Science and Technology, said in a recent interview with Kyodo News in Seoul that he "hesitates" over relying on overseas spent fuel reprocessing "in view of nonproliferation" and also pointed to high costs of transportation and measures to ensure safety.

Chang indicated it poses a problem that pure plutonium that can be used to produce nuclear weapons is extracted from spent fuel under the reprocessing method adopted at the Rokkasho facility.

The view of the former president of Korea Nuclear Society in South Korea casts a shadow over the future of the Japan Nuclear Fuel Ltd. facility, which has yet to start full-scale operation amid repeated problems even though nearly 20 years have passed since its construction began.

In May, a study group privately set up for then nuclear disaster minister Goshi Hosono proposed an option of accepting spent nuclear fuel from foreign countries at the Rokkasho reprocessing facility, as Japan had set the policy of reducing its dependence on nuclear power.

Panel members at that time envisioned South Korea as a candidate supplier of the spent nuclear fuel.
Chang, who offered advice to the Japanese government on its probe into the causes of the nuclear disaster at the Fukushima Daiichi power plant, also said that the United States and South Korea have agreed to conduct a joint study on a reprocessing method known as "pyroprocessing."

The expert said the pyroprocessing technology produces mixture of plutonium, americium, neptunium and other substances, and is thus better than the method used at the Rokkasho plant in terms of nuclear nonproliferation as weapons-grade pure plutonium is not produced.

Seoul and Washington are set to study the fuel reprocessing technology for 10 years after the entry into force of a revised bilateral civilian nuclear cooperation pact. The existing agreement will expire in 2014 and the two countries have been negotiating its revision.

Chang also said storage facilities for spent nuclear fuel in South Korea are expected to be full in 2023 and the purpose of studying the pyroprocessing technology is to greatly reduce the volume of spent fuel.

March 17, 2013

Time for Japan to end reprocessing

EDITORIAL: End nuclear fuel recycling program for sake of future generations

http://ajw.asahi.com/article/views/editorial/AJ201303180075

For years, Japan, under a national policy, has been seeking to build a nuclear fuel recycling system that extracts plutonium from spent fuel through reprocessing for reuse as new fuel. But the “nuclear fuel cycle” has yet to be realized.

In the first place, using plutonium to generate electricity is costlier than using only uranium as nuclear fuel. In addition, the project to develop fast breeder reactors, which are supposed to consume much of the extracted plutonium, has been stalled due to accidents at the Monju prototype reactor in Tsuruga, Fukui Prefecture. Furthermore, the Fukushima nuclear disaster in 2011 has made unclear the outlook for electric power generation through the use of mixed oxide (MOX) fuel, consisting of plutonium and uranium, in conventional reactors.

Japan already has a stockpile of about 45 tons of plutonium, including those whose reprocessing has been entrusted to overseas organizations. Of them, about 10 tons are stored in Japan. They alone are theoretically sufficient to produce more than 1,000 nuclear weapons.

Prime Minister Shinzo Abe has pledged to reduce Japan’s dependence on nuclear power generation as much as possible. Yet he has indicated his intention to keep the nuclear fuel cycle program alive.

The completion of the nuclear fuel reprocessing plant at Rokkasho, Aomori Prefecture, has been delayed repeatedly due to a series of troubles. But the government is hoping to bring the plant into full-scale operation in October this year. If the Rokkasho reprocessing plant comes on stream under the current situation, the amount of plutonium in Japan will likely keep growing. This is a policy that apparently contradicts Abe’s remark about reducing Japan’s dependence on nuclear power generation.

Trying to use plutonium for nuclear power generation is also undesirable from the reality of international politics. North Korea and Iran are engaged in nuclear development programs, making nuclear proliferation a serious security concern for the entire world.

Japan is the only non-nuclear country that is internationally allowed to reprocess spent nuclear fuel on a large scale. This fact reflects the trust of the international community in Japan, which is the only nation to have suffered nuclear attacks and has been adhering to its three non-nuclear principles of neither possessing or manufacturing nuclear weapons nor allowing other countries to bring them into Japanese territory. But Japan will lose the trust of the international community if it keeps accumulating plutonium with no clear plan on how to use it. If other countries try to pursue the use of plutonium by imitating Japan, it will be difficult to stop them.

There are great concerns in the United States as well about Japan's nuclear fuel reprocessing program. Steve Fetter, a professor at the University of Maryland, who recently served as assistant director at-large in the White House Office of Science and Technology Policy, has voiced opposition to the reprocessing since he worked in the office. Fetter warns that Japan will find it hard to win international support for its reprocessing program if it starts full-scale operation at the reprocessing plant and, as a result, causes a further increase in its stockpile of plutonium.

Japan's Nuclear Regulation Authority is expected to work out new safety standards for the reprocessing plant by the end of this year. There is no need for the government to rush to bring the Rokkasho plant online before the new standards are ready.

The best alternative method that can be chosen at the moment is to put spent nuclear fuel in air-cooled casks (dry casks) for several dozen years. The dry cask storage still needs further improvement, but the method has been safely used for decades in Western industrial nations. This would allow the government to postpone its decision on the final disposal method and use future technology to solve the sticky problem.

It is time for Japan to end the reprocessing program so that future generations will not face an increased risk of nuclear proliferation.

March 22, 2013

The Federation of Electric Companies of Japan in trouble

Plan eludes for fissile plutonium

http://www.japantimes.co.jp/news/2013/03/22/national/utilities-unable-to-devise-plan-on-use-of-reprocessed-fissile-plutonium/#.UUxpHzf1tEs

Kyodo

The Federation of Electric Power Companies of Japan has given up on devising a plan by March 31 on how to use 0.6 tons of fissile plutonium to be extracted by reprocessing spent nuclear fuel in the new fiscal year from April, sources said.

The federation cannot meet the end of March deadline because prospects are bleak that the nation's nuclear reactors will be rebooted anytime soon, including those that run on fuel containing plutonium, in view of the Fukushima disaster, the sources said Thursday.

The Japan Atomic Energy Commission has called on utilities to declare how they use extracted plutonium every fiscal year to ensure transparency. Stockpiling plutonium without making clear its uses could invite criticism from the international community, as the material can be diverted for nuclear weapons.

Japan had embarked on a program in which spent uranium fuel was to be reprocessed and the extracted plutonium and uranium reused as reactor fuel. The recovered material is turned into plutonium-uranium mixed oxide (MOX) fuel for pluthermal power generation. That program has effectively been put on hold amid the nationwide reactor shutdown due to the Fukushima crisis and subsequent widespread public opposition to atomic energy.

Japan Nuclear Fuel Ltd. still expects to reprocess about 80 tons of spent fuel in fiscal 2013 by starting up its troubled fuel reprocessing plant in Rokkasho, Aomori Prefecture. The process would produce about two tons of MOX, of which around 0.6 tons would be fissile plutonium, the sources said.

Given the gravity of the issue, the commission wants federation officials to provide an explanation next Tuesday.

April 8, 2013

Cost of reprocessing has tripled since 1995

Spent nuclear fuel reprocessing costs nearly triples, a blow to utilities

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201304080007

By SHIN MATSUURA/ Staff Writer

The cost for overseas reprocessing of spent nuclear fuel from Japanese nuclear power stations has nearly tripled since 1995 because of problems at a contracted British plant, which is likely to further hurt utilities and be passed along in rate hikes for electricity users.

The cost surged apparently because the plant is plagued with a slew of problems, including leakage of waste liquid.
The current cost at the plant that Japanese utilities commissioned for reprocessing is 122 million yen ($1.28 million) per container of vitrified high-level radioactive waste. That compares with 44 million yen in 1995, when the shipment of such waste from France back to Japan started.

The overall cost for reprocessing spent nuclear fuel into 790 more containers of waste that are scheduled to be returned to Japan is expected to be around 100 billion yen.

A rise in reprocessing costs is will strain utilities' balance sheets further, and to be passed on to consumers, according to experts.

Shipments of spent nuclear fuel from Japanese power stations to reprocessing plants in Britain and France started in the 1970s to extract plutonium and make nuclear fuel out of it. Large amounts of high-level radioactive waste, which is left over in the reprocessing work, is shipped back to Japan.

In late February, 28 containers of highly radioactive waste from Britain were returned to Japan Nuclear Fuel Ltd., a company tasked to operate Japan's reprocessing plant in Rokkasho, Aomori Prefecture. The shipment marked the first of its kind in a year and half.

According to Japan Nuclear Fuel's customs declaration to tax authorities in Hakodate in nearby Hokkaido, the import of all 28 containers totaled 3.4 billion yen, meaning one unit cost 122 million yen, about triple the 44 million yen per container in 1995.

Utilities said the import cost is calculated from the fee of transporting the spent fuel to and from Britain and the cost for reprocessing it into vitrified radioactive waste.

Japan completed a series of shipments of spent nuclear fuel to France and Britain by 2001, on the assumption that the Japanese reprocessing plant would begin operations, as part of the government's nuclear fuel cycle policy. Japan Nuclear Fuel's reprocessing plant was initially expected to be completed in 1997. But completion has been delayed 19 times due to a flaw in the process of vitrifying radioactive waste.

The transportation of high-level radioactive waste from France to Japan was completed by 2007. The overall reprocessing cost came to about 75.5 billion yen for a total of 1,310 barrels over a 12-year period through 2007.
The shipment of nuclear waste from Britain began in 2010. So far, about 132 containers have been returned to Japan in three shipments, totaling about 12.5 billion yen.

Masako Sawai, a member the Citizen's Nuclear Information Center (CNIC), a private anti-nuclear group of scientists and activists, said Japan should scrap the plan to reprocess spent nuclear fuel.

"Britain plans to shut down its reprocessing plant after the last shipment of radioactive waste to Japan is finished," Sawai said. "Japan should abandon the planned reprocessing activity and rather ponder how to restore and manage spent nuclear fuel."

May 13, 2013

What will happen with the Monju reactor?

Nuclear authority not to allow restart of Monju reactor

http://mainichi.jp/english/english/newsselect/news/20130513p2g00m0dm075000c.html

TOKYO (Kyodo) -- Japan's Nuclear Regulation Authority is considering not allowing the operator of the prototype fast-breeder nuclear reactor Monju to resume operations before its sloppy safety management is improved, sources close to the matter said Monday.

The expected order, coming after revelations last year that regular safety checks had been skipped, would require the Japan Atomic Energy Agency, the operator of the 280,000-kilowatt reactor in Tsuruga, Fukui Prefecture, to change its maintenance rules and inspection plans, according to the sources.

Although details still need to be worked out, under the agency's order the operator would not be able to replace nuclear fuel or move control rods -- important work toward restarting the reactor, which has been offline since an accident in August 2010.

The operator was found last November to have failed to conduct periodical safety checks on nearly 10,000 out of 39,000 pieces of equipment at the plant by the deadlines.

The Monju reactor first reached criticality in 1994 but was shut down in 1995 due to an accident. Regarded as key to realizing Japan's nuclear fuel cycle in which spent nuclear fuel from power plants is reprocessed for reuse as plutonium-uranium mixed oxide, or MOX, its restart in 2010, after 14 and a half years, hit a snag within a few months.

Monju reactor faces long-term suspension over lax safety system

http://ajw.asahi.com/article/behind_news/social_affairs/AJ201305130090

By HIDEKI MUROYA/ Staff Writer

Japan’s nuclear watchdog will indefinitely suspend the use of the Monju prototype fast-breeder reactor over the operator’s disregard for safety that continued even after the Fukushima nuclear crisis raised concerns across the nation.

The Nuclear Regulation Authority's order will deal a further blow to Japan’s nuclear fuel recycling program, which has long been plagued by technical problems and scandals.

In the latest case, the Japan Atomic Energy Agency, operator of Monju, was found to have skipped inspections of nearly 10,000 pieces of equipment since 2010, including crucial devices in the safety and emergency systems at the plant, based in Tsuruga, Fukui Prefecture.

The company also violated its own safety regulations, according to the NRA.

“Even when the reactor is offline, things stand in such a state,” an NRA official said after an on-site inspection of the reactor in February. “We cannot possibly approve a restart.”

The NRA will not allow the Japan Atomic Energy Agency to restart Monju operations until it comprehensively reviews its safety management system. The agency also plans to order the company to inspect all equipment items and overhaul its inspection programs.

The NRA’s order will dash the Japan Atomic Energy Agency’s plan to resume Monju operations by March 2014.

Hiroshi Hiroi, chief of the Monju facility, told The Asahi Shimbun that it will be difficult to complete inspections of all equipment items by the end of the year.

As of the end of March, 1,956 pieces of equipment remained uninspected, according to the Japan Atomic Energy Agency.

Hiroi also said the company will be unable to overhaul its inspection programs until at least next spring, indicating that the Monju reactor will not be restarted by the end of fiscal 2013.

The Monju, which can produce more nuclear fuel than it consumes, is a core component of Japan's nuclear fuel recycling program along with a spent fuel reprocessing plant in Rokkasho, Aomori Prefecture.

The program involves extracting plutonium from spent nuclear fuel and recycling it as fuel. Japan has spent nearly 1 trillion yen ($10 billion) on the Monju program, but problems continue to pile up.

The Monju reactor started a trial run in 1995, but it was soon halted due to sodium leakage. It resumed operations in May 2010, only to be taken offline three months later after a fuel exchanger fell into the reactor.

In September 1997, the government imposed a one-year suspension on Monju's operations over a falsified report on the sodium leakage.

The NRA's order will be different from the 1997 suspension order.

The latest order means that the Japan Atomic Energy Agency cannot even make preparations for a restart, such as checking the exchange of fuel, functions of control rods and airtightness of the containment vessel.

The NRA's predecessor, the Nuclear and Industrial Safety Agency, uncovered the lax procedures during a surprise inspection at the Monju reactor in September. NISA found that the Japan Atomic Energy Agency had not inspected key components of a sodium leakage detector.

The company's internal investigation later found that 9,847 pieces of equipment remained uninspected since 2010, including 55 devices requiring top-level safety, such as a neutron detector and an emergency diesel power generator.

The NRA conducted an on-site inspection at the Monju reactor in February and questioned company officials.

According to the NRA, the Japan Atomic Energy Agency officials in charge of inspections said they believed that the equipment was safe and did not submit reports to their supervisors. Managers also said they were not informed that the equipment had not been inspected.

Hiroi acknowledged that company officials had let their guard down.

"Front-line workers did not know when the reactor would restart, and the entire organization did not share an understanding on when inspections should be completed," Hiroi said.

The Japan Atomic Energy Agency drew up inspection programs for Monju equipment in 2009, when the company tried to resume operations after the sodium leakage and other scandals deepened public distrust in the government's nuclear policy.

But this sense of diligence did not last long.

The company's slipshod practices continued even after the nation's nuclear facility operators were required to take extra precautions after the Fukushima nuclear disaster in March 2011.

The NRA's suspension order is only one of the problems surrounding the Japan Atomic Energy Agency.

Experts have pointed out that a geological fault that runs directly below the Monju reactor could move in tandem with a nearby active fault.

In addition, the NRA plans to require the company to protect the Monju against earthquakes, tsunami and other serious accidents in accordance with new safety standards that take effect in July.

By HIDEKI MUROYA/ Staff Writer

Nuclear authority may order halt of Monju reactor

http://www3.nhk.or.jp/nhkworld/english/news/20130513_24.html

Sources have told NHK that Japan's Nuclear Regulation Authority is preparing to give the order to stop the use of the Monju fast-breeder reactor. The reactor uses plutonium extracted from spent nuclear fuel to generate power.

The prototype facility in Tsuruga, Fukui Prefecture, has been offline since a fuel exchange device fell into the reactor in August of 2010. The accident occurred just as the operator, the Japan Atomic Energy Agency, was restarting it. The reactor had been down for 14 years because of a sodium coolant leak.

The operator is being blamed for more than 9,800 safety lapses, including missed checkups on key safety equipment.

Missed inspections continued even after the operator filed a report in January on how these problems occurred.

The nuclear authority apparently concluded after its on-site inspection in February that the way the operator manages the reactor has some problems.

The authority will hold a regular meeting on Wednesday to discuss the matter. It is considering advising the operator to review its operational safety procedures.

If the authority goes ahead with a stop order, the reactor's restart, scheduled before March of next year, is likely to be delayed.

May 14, 2013

Keep Monju closed

NRA wants Monju to remain shut down

http://www.japantimes.co.jp/news/2013/05/14/national/nra-wants-monju-to-remain-shut-down/#.UZEys0psFEs

Lapses seen in JAEA checks of key reactor components

Kyodo, Staff Report

The Japan Atomic Energy Agency committed grave safety errors in managing the troubled Monju prototype fast-breeder reactor in Fukui Prefecture, and top officials at the Nuclear Regulation Authority said Monday they plan to make sure it stays closed.

The closure order to the government-linked JAEA will effectively dash any hope of trying to restart the reactor by year's end, dealing another setback to Japan's long-stalled plan to set up a nuclear fuel recycling system.

In September, the now-defunct Nuclear and Industrial Safety Agency carried out surprise inspections and determined that JAEA failed to regularly check key components of the experimental 280,000-kw reactor, as required by internal rules.

In November, the JAEA admitted that it failed to properly check nearly 10,000 pieces of equipment, including more than 50 critical "Class-1" components, including backup diesel electric generators.

The NRA, which replaced NISA last September, will also order the JAEA to rethink all its safety inspection regimens and management systems, sources said.

The NRA in December gave JAEA written instructions to investigate the causes of the improper checks and compile remedial measures.

But JAEA President Atsuyuki Suzuki reportedly insisted that the checks that were improperly carried out were mere formalities and posed no safety problems, drawing further criticism from the NRA.

"(Monju) is a very important facility in terms of safety, and it has a very strong social impact," NRA Chairman Shunichi Tanaka told a Dec. 12 NRA session.

Tanaka said he worries that the JAEA "lacks the basic safety culture" to manage nuclear power facilities.

Monju is designed to use plutonium-uranium mixed oxide (MOX) fuel to theoretically create more fuel than it consumes through the reaction process. MOX is made with weapons-grade plutonium.

But the prototype has been effectively closed since it suffered a grave sodium coolant leak and fire in 1995 and an attempted coverup. JAEA tried to restart Monju in 2010, but it was soon halted after a heavy fuel-loading device fell into the reactor vessel.

Many experts have questioned whether Monju, which sits in the city of Tsuruga, can ever be stably run, given its serious technical problems. Nearly ¥1 trillion in taxpayer money has been spent on the project.

Outside experts also say that dangerous active faults may exist beneath the reactor's key facilities. JAEA claims there is no evidence to support this allegation.

May 15, 2013

The (hi)story of Monju

Monju: Generating only misfortune

http://www.japantimes.co.jp/news/2013/05/15/reference/monju-generating-only-misfortune/#.UZJ7XUpsFEs

by Jun Hongo
Staff Writer

The troubled Monju prototype fast-breeder reactor made headlines again when the Nuclear Regulation Authority said it apparently plans to ensure the facility remains idled after announcing that the Japan Atomic Energy Agency failed to properly inspect some 10,000 components, including critical ones.

Following are questions and answers regarding the problem-plagued Monju program, which has so far cost some ¥1 trillion:

Where is Monju located and when was it built?

Monju is on the Sea of Japan coast in Tsuruga, Fukui Prefecture. Preparatory construction began in January 1983, and the site was completed in April 1991.

The reactor reached initial criticality for the first time in April 1994, but the event was short-lived.

What was Monju's role?

Monju was to serve as a research facility on so-called dream technology that was supposed to resolve Japan's shortage of clean energy sources.

The plan was for the fast-breeder reactor to use spent nuclear fuel from other atomic plants in the form of a plutonium-uranium mixed oxide (MOX) fuel.

"The basic principles of the Monju plant are very simple," JAEA states on its website. If the recycling sequence goes as planned, it would mean "fast reactors could extend the energy output from the world's uranium fuel reserves 25-fold."

MOX, however, which is used in nuclear weapons, is highly dangerous.

How has Monju fared since the 1994 criticality test?

Accidents, a coverup attempt and other woes and malfunctions have keet the reactor effectively idled since its initial tryout.

A sodium coolant leak and fire in 1995 became a huge scandal after it was revealed that the operator tried to cover up details of the incident from the public.

In 1996, an official appointed to the internal investigation of the case committed suicide. The official's next of kin subsequently sued the operator for damages, claiming he killed himself after being pressured to lie to the media. The Supreme Court last year rejected the suit and ruled in JAEA's favor.

Fukui residents meanwhile sued the state, claiming the reactor is unsafe. The Supreme Court in 2005 overruled a lower court ruling and dismissed the suit.

What happened after the sodium leak?

Monju was suspended for 14 years and five months after the leak, until May 2010.
The JAEA website states that Monju restarted its System Start-up Test on May 6, 2010, hoping to accomplish the program's original mission of demonstrating the facility's reliability and establishing sodium handling technology. It failed to do either.
On Aug. 26 that year, a 3-ton fuel-loading device fell into the reactor vessel and caused operations to halt again. Recovery of the device proved time-consuming and was only completed in June 2011, 10 months after the incident and shortly into the biggest nuclear plant calamity to hit the world since Chernobyl, namely the triple-meltdown crisis at Tokyo Electric Power Co.'s Fukushima No. 1 atomic plant.
It cost more than ¥1.7 billion to repair the Monju damage. A JAEA official in charge of the recovery project committed suicide before the fuel-loading device was retrieved.

What other troubles stand in Monju's way?

Like most nuclear plants in Japan, Monju is believed to be sitting on a fault, although JAEA in April sent a report to the NRA claiming the fault is inactive.
The JAEA has also said the reactor can withstand the strongest temblor that could possibly hit the site, as well as tsunami of up to 21 meters.
The NRA is expected to visit Fukui and survey the fault soon.

What does "monju" mean?

According to JAEA, Monju derives from the Japanese translation of bodhisattva Manjusri, which is associated with perfect enlightenment and wisdom.
Buddhist temples, including Eiheiji in Fukui Prefecture, have protested the use of the holy name for such a tarnished project.

What's next for Monju?

Reports say Monju costs ¥10 billion to ¥20 billion annually just to maintain even while idled.
The government originally intended to start commercial use of the reactor by 2050, but the latest development will likely put the nuclear fuel-recycling goal on indefinite hold.
Despite widespread public opposition to nuclear power since 2011 and calls by pundits that Monju be scrapped, the ruling Liberal Democratic Party appears reluctant to do this.

How is JAEA reacting to the latest scandal?

In a Chunichi Shimbun interview published on May 1, JAEA chief Hiroshi Hiroi acknowledged the agency failed to properly check some 10,000 components.

"Due to a lack of communication between the managers and onsite workers, our revised rules weren't completely followed, and we didn't share a common understanding of when to start the checks," he claimed.

JAEA seeks to correct the problem by adding 13 more employees to the repair unit, creating better information management and educating its workers.

"We will make a safe, rational maintenance program in about a year," he told the newspaper.

No restart for Monju.... for now

Nuclear watchdog to effectively ban Monju from restarting

http://mainichi.jp/english/english/newsselect/news/20130515p2g00m0dm062000c.html

TOKYO (Kyodo) -- The Nuclear Regulation Authority decided Wednesday to issue an order effectively prohibiting the Monju prototype fast-breeder nuclear reactor from restarting, noting a series of problems with safety management.

"The Japan Atomic Energy Agency cannot sufficiently secure the safety of Monju," the NRA said in a document, referring to a delay in planned checkups of a wide range of equipment at Monju, reported last November, and subsequent blunders.

"We see deterioration in its safety culture," it said.

Under the order, expected later this month after necessary procedures are taken, the JAEA will be barred from engaging in preparatory work for resuming Monju operations until it rebuilds its maintenance and management system for the facility.

A senior NRA official said the order will likely be in place at least until around January next year because the JAEA is not expected to finish inspecting the equipment by that time.

The development is another blow to the Monju reactor, which has remained offline for most of the past 20 years or so due to troubles. Japan has been hoping the facility would play a key role in the country's nuclear fuel recycling process.

The Monju reactor first achieved criticality in 1994 but was shut down due to a serious accident involving a leak of sodium coolant and a resulting fire in 1995.

It resumed operations in May 2010, but the launch of full operations was delayed again after a device in the reactor fell inside the vessel in August that year.

In November 2012, the JAEA said it skipped necessary procedures upon delaying the inspections of nearly 10,000 devices, including those that are categorized as important for safety. A report submitted by the JAEA on the issue in January this year also included mistakes.

Monju ordered not to prepare for reactor restart

http://www3.nhk.or.jp/nhkworld/english/news/20130515_24.html

Japan's Nuclear Regulation Authority has decided to issue orders not to prepare to restart the Monju fast-breeder reactor in Tsuruga, Fukui Prefecture.

The prototype reactor, currently offline, generates power using plutonium extracted from spent nuclear fuel.

The decision was made at the NRA's meeting on Wednesday. It was based on results of earlier inspections.

A government inspection last year found more than 9,800 missed checkups for equipment at the reactor.
It was later found that the reactor's operator, the Japan Atomic Energy Agency, failed to make thorough safety checks despite submitting a report promising to improve safety procedures.

At the meeting on Wednesday NRA chief Shunichi Tanaka and other participants criticized the operator for repeating irregularities.

They decided that the operator lacks appropriate safety management. They concluded that the operator should not be allowed to prepare to restart the reactor until it is ascertained under the law that improvements are in place.

Monju has been offline since a fuel exchange device fell into the reactor in August 2010. The accident occurred just as the operator was restarting it. The reactor had been shut down for 14 years due to a sodium coolant leak.

The NRA will allow the Monju operator to give its account on the matter, before formally issuing the order. This will likely delay the reactor's scheduled restart until the end of next March.

May 16, 2013

It makes sense

Editorial: No choice but to decommission prototype fast-breeder reactor Monju

http://mainichi.jp/english/english/perspectives/news/20130516p2a00m0na003000c.html

The Nuclear Regulation Authority (NRA) has decided to order the Japan Atomic Energy Agency (JAEA) not to go ahead with preparations to resume operations at its trouble-plagued prototype fast-breeder nuclear reactor Monju in Tsuruga, Fukui Prefecture.

The JAEA acknowledged in November last year that it had failed to check about 10,000 parts of the reactor in its inspections. The NRA further found in a subsequent inspection of Monju that the JAEA had failed to examine other key devices of the reactor, such as emergency diesel power generators, and concluded that the agency had not established a sufficient system to ensure safety of the reactor. As such, the authority's order is only natural as the failure to thoroughly examine the reactor is unworthy of a nuclear facility operator.

We have insisted that the government's so-called nuclear fuel cycle policy of extracting plutonium from spent nuclear fuel and burning it in fast-breeder reactors has failed. The NRA has confirmed that the safety culture of the operator of the Monju reactor, which is the core of the nuclear fuel cycle policy, has deteriorated. Prime Minister Shinzo Abe has declared that his administration will continue

the nuclear fuel cycle policy, but the government should promptly decommission Monju and put an end to the nuclear fuel cycle policy.

Monju was shut down after sodium that leaked from the reactor caught fire in December 1995 shortly after its operations began. It is difficult to control a fast-breeder reactor and to respond to the accident as sodium that is used as coolant can easily react to water and burn intensely. The operator of the plant was also criticized for covering up video footage of the fire.

Monju was reactivated in May 2010, about 14 1/2 years after the accident, but operations came to a halt again after a key device had dropped inside the reactor. Experts have also pointed to the possibility that an active fault lies within the premises of the facility, and the NRA is poised to conduct an on-the-spot inspection.

Although more than 1 trillion yen has been spent on the project, there are no prospects that fast-breeder reactors can be put into practical use in the foreseeable future. Approximately 20 billion yen is necessary each year to maintain the reactor although it has been suspended. Many other developed countries have abandoned such projects mainly because of technological difficulties.

The completion of a spent nuclear fuel reprocessing plant under construction in the Aomori Prefecture village of Rokkasho -- another key facility in the nuclear fuel cycle project -- has been postponed 19 times.

JAEA President Atsuyuki Suzuki has also come under fire for remarking that it is inevitable that mistakes will happen after it came to light that the organization failed to examine many parts of the reactor. Suzuki, who specializes in the nuclear fuel cycle, previously served as chairman of the now defunct Nuclear Safety Commission, and was appointed as JAEA chief in 2010 after applying for the position publicly advertised by the agency.

The JAEA is an organization responsible for research on Japan's nuclear energy safety. Therefore, one cannot help but wonder whether Suzuki's remarks are unworthy of a leader of such an organization who is supposed to be fully aware of the importance of nurturing a culture of safety. His remarks have given the public the impression that the culture of the so-called "nuclear power village," in which government officials, utilities and nuclear technology experts collude to promote nuclear power, has remained unchanged since the accident at the tsunami-hit Fukushima No. 1 Nuclear Power Plant in March 2011.

Other operators of nuclear facilities as well as government regulators should draw a lesson from the JAEA's failure to examine many parts of the Monju reactor and make efforts to firmly establish their own safety measures.

May 17, 2013

Suzuki resigns

Head of operator of fast-breeder reactor resigns

http://mainichi.jp/english/english/newsselect/news/20130517p2g00m0dm055000c.html

TOKYO (Kyodo) -- The president of the Japan Atomic Energy Agency, the operator of the Monju prototype fast breeder reactor, resigned Friday over the state-run agency's failure to properly inspect the reactor, science and technology minister Hakubun Shimomura said.

Shimomura told a regular news conference that he had accepted Atsuyuki Suzuki's offer to resign, adding he will pick Suzuki's successor shortly.

On Wednesday, the Nuclear Regulation Authority announced its decision not to allow the JAEA to engage in preparatory works toward resuming operation of the Monju reactor after identifying problems in its safety management.

The Monju fast-breeder reactor, with an output capacity of 280,000 kilowatts, is located in the city of Tsuruga, Fukui Prefecture, on the Sea of Japan coast.

It went into operation in 1991 but had mostly been shut down since 1995 after a sodium leakage led to a fire. It resumed operation in May 2010 but was shut down again due to a series of problems.

In November 2012, the JAEA said it had failed to conduct inspections at appropriate intervals on many devices of the reactor.

Investigations by the NRA showed that the operator had failed to conduct inspections on some key devices at appropriate intervals.

Suzuki said at first that the failure was a procedural mistake, drawing criticism from NRA Chairman Shunichi Tanaka, who said Suzuki's remark was inappropriate.

Suzuki, 70, an authority on the nuclear fuel cycle, assumed the presidency of the JAEA in August 2010 after serving as professor at the University of Tokyo and as chairman of the now-defunct Nuclear Safety Commission.

Yonezo Tsujikura, vice president of the JAEA, will serve as acting president until Suzuki's successor is picked, officials said.

The JAEA was established in October 2005 through the merger of the Japan Atomic Energy Research Institute and the Japan Nuclear Cycle Development Institute.

Monju reactor unlikely to resume operations by next March: JAEA

http://www.japantimes.co.jp/news/2013/05/17/national/monju-reactor-unlikely-to-resume-operations-by-next-march-jaea/#.UZXgukpsFEs

Kyodo

The Monju prototype fast-breeder nuclear reactor will unlikely be able to resume operations by the end of the current fiscal year, the research institute that owns the facility said Thursday.

The remarks were made a day after the Nuclear Regulation Authority decided not to allow the Japan Atomic Energy Agency to engage in preparatory work for resuming operations at Monju because it sees problems in its safety management.

The NRA summoned JAEA President Atsuyuki Suzuki on Thursday to convey the decision and to notify him that the agency will be given an opportunity to explain its views by May 23. Following such a procedure, the NRA is expected to issue, possibly later in the month, an order that will effectively prohibit the reactor's resumption.

Suzuki told NRA Secretary General Katsuhiko Ikeda that he took the situation "seriously."
As for the operation of Monju, Suzuki told reporters, "It takes nearly one year for preparation and it is physically quite difficult (to restart it within the current fiscal year through March)."
The NRA's decision is another blow to the Monju reactor, which has remained largely offline since first achieving criticality in 1994, due to a leakage of sodium coolant and other subsequent problems.
The JAEA has been found to have failed to conduct inspections on appropriate intervals on nearly 10,000 devices, including those that are categorized as important for safety.
The NRA looked into the case in detail and determined that the agency's "safety culture is deteriorating," given that the agency could not address the problems even though people had been aware of the delayed inspections.

May 18, 2013

Monju shutdown: Abe should heed the opinion of the NRA

Shut Monju down permanently

http://www.japantimes.co.jp/opinion/2013/05/18/editorials/shut-monju-down-permanently/#.UZZ8V0psFEs

T he Nuclear Regulation Authority on Wednesday decided to order the Japan Atomic Energy Agency to not engage in further preparatory work to restart the trouble-plagued Monju prototype fast-breeder reactor until the operator improves its safety management to prevent a recurrence of trouble. Monju, located in Tsuruga, Fukui Prefecture, is a core component of Japan's nuclear fuel cycle project along with the spent nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture.

Monju has been inoperative for most of the past 19 years while Rokkasho reprocessing plant's full operation has been postponed 19 times due to a series of problems. Given this troubling history and the JAEA's slipshod safety management, the logical conclusion should be to decommission the Monju reactor and end the nuclear fuel cycle project. The NRA should unambiguously order the JAEA not to restart Monju.

The NRA pointed out that the JAEA had made light of the need to ensure safety at Monju and failed to inspect nearly 10,000 reactor components in an after 2010. Making matters worse, JAEA head Mr. Atsuyuki Suzuki, who resigned Friday, said that the failure to inspect the components was only a procedural matter and did not cause safety problems. Yet among the components are more than 50 parts vital for the safety of the reactor, including a neutron detector that reveals radiation leaks. His attitude is deplorable.

NRA head Mr. Shunichi Tanaka said that the JAEA lacks a basic understanding of safety. Clearly the JAEA has learned nothing from the Fukushima nuclear catastrophe, which was caused in part by lax management.

The Monju reactor achieved criticality in April 1994 but was shut down in December 1995 due to a sodium coolant leak and fire. Subsequently it was found that the operator tried to cover up the

seriousness of the accident. In May 2010, the reactor was restarted but it was halted again before reaching full output because fuel-loading equipment fell into the reactor vessel that August. Nearly ¥1 trillion has been spent on the Monju project. The reactor requires about ¥20 billion in funding annually even while offline.

In a nuclear fuel cycle, uranium and plutonium are extracted through the reprocessing of spent nuclear fuel. A fast-breeder reactor uses plutonium as fuel and theoretically is capable of producing more plutonium than it burns. But the reprocessing also produces highly radioactive waste and the vitrification technology needed to safely store it has not been established. Other countries have abandoned their nuclear fuel cycle projects because of high costs and technical difficulties. Because Monju is offline, the power industry tried to use plutonium separated from spent nuclear fuel in ordinary light water reactors. But this so-called pluthermal approach has hit a snag because of the Fukushima nuclear crisis.

Despite the enormous costs and problems involved in the nuclear fuel cycle project, Prime Minister Shinzo Abe says he will push ahead with the project. He should heed the opinions of the NRA experts and shut this dangerous reactor down.

May 23, 2013

Stopping restart of Monju official soon?

Nuclear watchdog to officially prohibit restart of Monju

http://mainichi.jp/english/english/newsselect/news/20130523p2g00m0dm040000c.html

TOKYO (Kyodo) -- The Nuclear Regulation Authority will officially decide May 29 to issue an order effectively prohibiting a restart of the idled Monju prototype fast-breeder nuclear reactor due to a series of problems with safety management, sources close to the authority said Wednesday.

The Japan Atomic Energy Agency, which operates the Monju reactor, told the NRA on Wednesday in a statement that it will not oppose the authority's decision as it "takes the NRA's judgment seriously" and pledges to improve its safety management "as soon as possible."

Under the order, the JAEA, which had aimed to resume the Monju operations by the end of next March, will be barred from engaging in preparatory work for the restart until it rebuilds its maintenance and management system for the facility.

On May 15, the NRA said the JAEA "cannot sufficiently secure the safety of Monju," referring to a delay in planned checkups of a wide range of equipment at the reactor reported last November, and subsequent blunders.
The JAEA has been found to have failed to conduct inspections at appropriate intervals on nearly 10,000 devices at Monju, including those categorized as important for safety.

The NRA looked into the case in detail and determined the agency's "**safety culture is deteriorating,"** given that the agency could not address the problems even though people had been aware of the delayed inspections.
JAEA President Atsuyuki Suzuki has stepped down to take responsibility over the matter.

The Monju reactor has remained largely offline since first achieving criticality in 1994, due to a leakage of sodium coolant and other subsequent problems.

May 27, 2013

What is with Rokkasho?

Operation up in air at nuclear fuel recycle plant reprocessing

http://www3.nhk.or.jp/nhkworld/english/news/20130527_22.html

All pre-startup tests at a nuclear fuel recycle plant in northern Japan have been completed. But it is unclear when the facility will be put to commercial use.

Japan Nuclear Fuel owns the facility in Rokkasho Village, Aomori Prefecture. The company says it has successfully completed all necessary tests to start running the facility.

The final test began on May 8th and ended late Sunday. The aim was to ensure the safety of a furnace for melting glass used to solidify high-level radioactive waste water. Various tests have been done on and off over the past 12 years.

The company says it plans to complete a trial run by October. This is pending inspections by the Nuclear Regulation Authority.

But the nuclear authority says it will not inspect the facility until December. Officials say that is when it will come up with a new set of nuclear fuel reprocessing standards. New standards take into account lessons learned from the 2011 Fukushima Daiichi nuclear accident.

May 29, 2013

Regulators to issue order effectively banning restart of Monju

http://mainichi.jp/english/english/newsselect/news/20130529p2g00m0dm078000c.html

TOKYO (Kyodo) -- The Nuclear Regulation Authority on Wednesday officially decided to prohibit the Monju prototype fast-breeder reactor from being put online, dashing the operator's hopes of restarting the facility by the end of next March.

The harsh measure against the Japan Atomic Energy Agency, a national research institute, came in response to slack safety checkups observed in the Monju reactor in Fukui Prefecture, western Japan. A written order will be handed over to the JAEA on Thursday.

The JAEA is in further trouble because of a radiation leak accident at its laboratory northeast of Tokyo on Thursday that resulted in 33 out of the 55 people there being exposed to radiation.

During a meeting of the NRA commissioners on Wednesday, Chairman Shunichi Tanaka highlighted the fact that a radiation protection supervisor allowed radioactive substances to be released into the atmosphere via a ventilation fan in a laboratory building where contamination was confirmed.

"It is regrettable that people lacked preparedness for the use of radiation," Tanaka said, while calling on the need to check in detail what appears to be a mistake in the supervisor's decision.

The JAEA also waited more than 24 hours before reporting the accident to the state, saying that it had underestimated the seriousness of the incident.

In regard to the operation of Monju, the JAEA will be barred from engaging in preparatory work for resuming the reactor until it rebuilds a maintenance and management system for the facility.

The delay in restarting Monju could affect Japan's nuclear fuel recycling policy, which aims at reprocessing spent nuclear fuel and reusing the extracted plutonium and uranium as reactor fuel.

Japan has been hoping the Monju project would play a key role in the fuel recycling flow, having spent more than 1 trillion yen on its maintenance and construction. But the reactor has remained largely offline since first achieving criticality in 1994, due to a leakage of sodium coolant and other subsequent problems.

The JAEA has also been found to have failed to conduct inspections at appropriate intervals on nearly 10,000 devices, including those that are categorized as important for safety, leading the NRA to take the latest move.

The NRA also said Wednesday that it will start from June a process to assess whether geologic faults at the premises of the Monju facility are active. The NRA is conducting or plans to conduct similar assessments on a total of six facilities nationwide.

May 30, 2013

Monju to stop restart

Monju operator ordered to stop restart preparation

http://www3.nhk.or.jp/nhkworld/english/news/20130530_19.html

Japan's nuclear regulator has ordered the operator of the Monju fast-breeder reactor to suspend preparation for its restart until measures are put in place for its proper maintenance and management.

A senior official of the Nuclear Regulation Authority communicated the order on Thursday to the Japan Atomic Energy Agency's executive vice president.

The regulators acted after finding the operator had missed checkups on about 10,000 pieces of equipment.

They ordered that sufficient manpower and funds be allocated for maintenance and management. They also called for a system ensuring accurate equipment checks.

Executive Vice President Yonezo Tsujikura said the agency will address the problem.

The Nuclear Regulation Authority requested that Japan's science ministry urge the operator to comply.

As a consequence of the order, the Monju reactor is unlikely to restart before next March.

The reactor in Tsuruga City, central Japan, is at the center of the nation's nuclear-fuel recycling policy. But its operator has been hampered by a series of problems.

Regulators effectively ban Monju reactor from restarting

http://mainichi.jp/english/english/newsselect/news/20130530p2g00m0dm077000c.html

TOKYO (Kyodo) -- The Nuclear Regulation Authority on Thursday issued an order that effectively prohibits the Monju prototype fast-breeder reactor from restarting until the operator improves its safety management system.

The move came after the Japan Atomic Energy Agency, a national research institute, was found last year to have failed to conduct inspections at appropriate intervals on nearly 10,000 devices at the reactor in Fukui Prefecture, western Japan.
The NRA looked into the case in detail and determined the agency's "safety culture is deteriorating," given that it could not address the problems despite being aware of the delayed inspections.

The decision is the latest blow to Japan's Monju project, on which it has spent more than 1 trillion yen in hopes it would play a key role in the country's spent fuel recycling policy. The reactor has remained largely offline since first achieving criticality in 1994, due to a sodium coolant leakage and other subsequent problems.

Under the order, the JAEA will be barred from engaging in preparatory work for resuming the reactor until it rebuilds a maintenance and management system by appropriately allocating funds and human resources to prevent a recurrence.
JAEA President Atsuyuki Suzuki has stepped down to take responsibility over the matter.

Monju must remain idled, NRA to order (Kyodo)

http://www.japantimes.co.jp/news/2013/05/30/national/monju-must-remain-idled-nra-to-order/#.UaZh_thBpg4

June 8, 2013

Monju - Just a mistake

Monju reactor's sodium heater temporarily halted by error

http://mainichi.jp/english/english/newsselect/news/20130608p2g00m0dm038000c.html

TSURUGA, Japan (Kyodo) -- Part of the Monju prototype fast-breeder reactor halted last weekend due to human error, the Japan Atomic Energy Agency said late Friday on the heels of an effective ban on restarting the reactor due to the operator's deteriorating safety culture.

A heater that keeps sodium molten as a secondary coolant for the reactor in Tsuruga, Fukui Prefecture, in western Japan, halted for some 30 minutes from about 4:30 p.m. Sunday during a checkup of a power supply system, causing the sodium temperature to fall about 40 C from 200 C, while its melting point is around 98 C, it said.

The JAEA attributed the error to insufficient information in its service manual, and said it reported the event Monday to the Nuclear Regulation Authority and the local governments, but lagged in making it known to the public as it was too minor an incident to compel it to report to authorities under internal rules.

The agency's failure to properly inspect Monju prompted the nuclear authority to issue an order May 30 that effectively prohibits the reactor from restarting until the state-run operator improves its safety management system.

July 3, 2013

Stricter requirements for 9 facilities involved in fuel processing

Nuclear watchdog tightening safety regulations on fuel processing plants

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201307030048

By JIN NISHIKAWA/ Staff Writer

The Nuclear Regulation Authority presented its draft outline July 2 for tighter regulation standards for facilities dealing with nuclear fuel, such as the spent fuel reprocessing plant in Rokkasho, Aomori Prefecture.

The Rokkasho plant entered trial runs in 2006, but its completion has been delayed 19 times due to repeated operation failures. The operator, Japan Nuclear Fuel Ltd., said it hoped the plant would be ready for operations in October.

But only after the new standards for nuclear fuel facilities take effect in December is the NRA expected to be ready for safety screenings using the updated regulations. That will be followed by obligatory pre-operation tests and the conclusion of safety agreements with local governments where such facilities are located.

That means the Rokkasho reprocessing plant is not expected to enter full operations until next year at the earliest.

The proposed regulations include obligatory preparations to counter catastrophic accidents, as well as earthquake and tsunami preparedness measures, that are as rigorous as those spelled out in a separate set of new regulation standards for nuclear reactors that will take effect on July 8.

The new catastrophic accident preparedness requirements will be **applicable to nine facilities** that engage in fuel processing, reprocessing and other operations.

Those facilities will be required to take more stringent measures to prevent radiation leaks that could result from future disasters, such as the evaporation of highly radioactive liquid waste due to a cooling system failure, fire or a hydrogen explosion like the one that occurred at the Fukushima No. 1 nuclear power plant after the March 2011 Great East Japan Earthquake and subsequent tsunami.

More specifically, the reprocessing plant will be called on to install firefighting vehicles and power generation vehicles, an earthquake-proof and radiation-proof emergency response center and systems that can spray water on every single building in the plant. Additionally, the plant will be required to make sure it can operate using emergency backup power sources for a week in the event all external power supplies are down.

And, as is the case with nuclear reactors, no key components of the reprocessing plant will be allowed to lie directly atop active geological fault lines. Surveys will be commissioned to study possible active faults covering as far back as 400,000 years.

The now-defunct Nuclear and Industrial Safety Agency, one of the NRA predecessors, had pointed out a need for in-depth geological survey of the Shimokita Peninsula, the site of the Rokkasho reprocessing plant. The NRA is expected to take it upon itself to conduct such surveys as part of its safety screening measures.

July 21, 2013

Monju inspection a "long drawn-out process"

Govt's nuclear fuel cycle policy teeters on edge as onsite Monju inspection completed

http://mainichi.jp/english/english/newsselect/news/20130719p2a00m0na014000c.html

An expert team investigating geologic faults below the Monju prototype fast-breeder reactor has announced that the deliberations will be a drawn-out process, casting further uncertainty on the national government's nuclear fuel cycle policy.

Among the five-person panel appointed by the Nuclear Regulation Authority (NRA), four members spent two days investigating the activity of shattered zones, or zones of crushed rock, and whether they could possibly shift in the future.

The panel will wait for its fifth member, Chiba University professor Takahiro Miyauchi, to complete an onsite visit since he was unable to participate in the two-day inspection. An assessment meeting will then be convened as early as late August.

NRA Commissioner Kunihiko Shimazaki, who heads the panel, hinted that the process is expected to take time. "This is not a situation where we will be able to draw a quick conclusion," he said.

The Monju prototype fast-breeder reactor -- **a central pillar of the government's nuclear fuel cycle policy --** is subject to the same new safety standards as other nuclear reactors. As such, key facilities are prohibited from being installed above active faults.

Eight shattered zones have been found directly beneath the Monju reactor. One of them runs for 250 meters directly underneath an auxiliary facility housing equipment that exchanges the sodium used to cool down the reactor. In the latest survey, the expert panel inspected the shattered zones that appeared in a ditch dug nearby, and also collected clay from the site.

Panel members have said, however, that the sample available to them is insufficient in identifying the timeline when the faults were active -- a crucial factor in determining whether the faults remain active today. Consequently, they have called for an expansion of the inspection site.

The panel also inspected an active fault called the Shiraki-Nyu fault that runs north and south some 500 meters from the western edge of the Monju. Experts have pointed out the possibility that this active fault could move together with the shattered zones within the Monju grounds. Because the Shiraki-Nyu fault slants underground, it runs below Monju about 850 meters below the surface of the ground.

Panel head Shimazaki said, "One of the challenges we face will be to determine whether the facility can tolerate the shocks from an earthquake (caused by this active fault)."

Among additional surveys the panel will carry out, seabed investigations in waters surrounding Monju are expected to take a particularly long time to complete. A fixed fishing net has been installed in the spot designated for inspection, and will not be removed until November at the earliest.

The existence of active faults has been a key factor in deciding whether nuclear plants will be reactivated.

This past May, the NRA acknowledged that a fault running directly underneath the No. 2 reactor of the Tsuruga Nuclear Power Plant in Fukui Prefecture, operated by the Japan Atomic Power Co. (JAPC), was active. In response, JAPC filed an objection based on the Administrative Appeal Act.

"We will promptly handle the additional investigations that have been suggested, and prove that the fault is not active," Monju deputy director Makinori Ikeda said.

Even if the NRA concludes that the faults are active, the Japan Atomic Energy Agency (JAEA) is likewise expected to respond with an all-out defensive, delaying any hope of a swift resolution even further.

August 27, 2013

EDITORIAL: Continuing Monju project doesn't make sense

http://ajw.asahi.com/article/views/editorial/AJ201308270040

The Ministry of Education, Culture, Sports, Science and Technology doesn't seem to grasp what should be the top propriety in nuclear power research and development right now, which is the most important question for the nation's nuclear energy policy.

The ministry has worked out an outline for reforming the Japan Atomic Energy Agency (JAEA), which has been plagued by a series of problems and scandals.

As one of the high priority projects for the semi-public entity engaged in nuclear power research and development, the ministry cites the effort to establish a nuclear fuel recycling system in which the Monju prototype fast-breeder reactor in Fukui Prefecture plays the central role.

This is an outrageously wrong-headed proposition. The ministry should confront the dire consequences of the Fukushima nuclear disaster, drop fantasies of nuclear fuel recycling and change its policy. The sooner the better, we might add.

Calls for fundamental reform of the JAEA first emerged after it was revealed that the operator of the Monju reactor had neglected to carry out required inspections of thousands of pieces of equipment.

The ministry's reform blueprint would create a new organization modeled on the private-sector operator of a nuclear power plant to take charge of Monju. Experts loaned from electric utilities would join the staff to operate the experimental reactor.

But Monju is far from entering practical use.

It would be extremely unreasonable to put experts in routine operations of a nuclear plant in charge of running such a facility, given that Monju is still in the research and development phase and could be plagued by additional problems.

Many members of the Nuclear Regulation Authority (NRA) bitterly criticized the ministry's reform plan. One of them said the plan raises serious doubt about whether the JAEA understands and takes pride in its role as the principal research institute that supports the nation's nuclear power generation. Commenting on the current state of the JAEA, NRA Chairman Shunichi Tanaka, who once worked for the organization, said, "If you ask me whether it (JAEA) is being helpful for the NRA during these difficult times, I must say its performance is very unsatisfactory."

The nuclear accident at the Fukushima No. 1 nuclear power plant has drastically changed the policy priorities concerning atomic energy research and development.

The most urgent priority is, as the ministry points out, to deal with the consequences of the nuclear disaster, such as plugging the leak of radioactive water into the environment. This crisis can only be solved by pouring all human, material and financial resources available into the efforts to tackle the challenge.

The nuclear fuel recycling system, which involves extracting plutonium from spent nuclear fuel, doesn't work unless many reactors are in operation.

The adoption of tighter nuclear safety standards that are based on lessons learned from the Fukushima accident has effectively made it impossible to restart many currently idled reactors. The ministry should immediately stop wasting time and money on Monju, which has little chance of carving out a viable future for itself.

Instead, it must start making all-out efforts to develop technologies and human resources that will be useful for cleaning up the mess created by the accident and enforcing the safety standards.

This is, however, not a problem that should be blamed only on the science ministry. The government as a whole is also responsible for the situation because it has yet to say anything specific about how it intends to change its nuclear energy policy even though nearly two and a half years have passed since the nuclear crisis began.

If the government keeps looking away from the fact that the nuclear accident has delivered a fatal blow to the policy of promoting nuclear fuel recycling, it will never be able to make timely responses to the ongoing crisis.

The Abe administration should focus its policy efforts on responding to the accident and swiftly lay out a clear and specific plan to reduce Japan's dependence on atomic energy.

August 28, 2013

Reprocessing in Japan - When is enough enough?

Experts urge Japan to break away from 'failed' nuclear reprocessing program

http://ajw.asahi.com/article/behind_news/politics/AJ201308280071

By YASUJI NAGAI/ Senior Staff Writer

In a proposal submitted to The Asahi Shimbun, researchers at an international group of nuclear experts outlined steps they say Japan must take to break away from its “failed” nuclear fuel recycling policy.

Masafumi Takubo and Frank von Hippel of the International Panel on Fissile Materials noted that Japan currently has 44 tons of already separated plutonium, enough to make more than 5,000 Nagasaki-type atomic bombs, while it has no clear path toward disposal.

In the proposal titled, “Ending plutonium separation: An alternative approach to managing Japan’s spent nuclear fuel,” they said Japan’s reprocessing policy has “insignificant” resource conservation and radioactive waste management benefits.

It is also “becoming increasingly dysfunctional, dangerous and costly,” since weapon-useable separated plutonium is a “magnet for would-be nuclear terrorists,” the authors said. Japan’s program is also setting an ill example for countries interested in nuclear-weapon options, they added.

The IPFM is a group of independent nuclear experts from 17 countries whose goal is to promote international initiatives to reduce stocks of plutonium and uranium and limit any further production.

Japan still pins hope on starting reprocessing at the Rokkasho Reprocessing Plant in Aomori Prefecture. But the practical use of its prototype breeder reactor, Monju, is nowhere in sight, the researchers said.

Japan has decided to recycle its accumulating separated plutonium into mixed-oxide (MOX) uranium-plutonium fuel for light water reactors, but this program, too, has failed, they added.

The report says Japan cannot change its reprocessing policy without the central government and nuclear utilities making a number of difficult decisions at the same time.

One of the decisions is that the central government should convince prefectural and local governments that host Japan’s nuclear power plants to allow on-site dry-cask storage.

The government should also make arrangements to allow Aomori Prefecture and the village of Rokkasho, which are accepting spent fuel, to receive benefits in forms of tax revenue and employment, even after the government gives up its recycling program, the report says.

The government also needs to amend the law governing the national Reprocessing Fund to allow Japan Nuclear Fuel Ltd. to continue to pay back the loans used to pay for the Rokkasho Reprocessing Plant even if a decision is made not to start its commercial operation.

The difficult decisions regarding the pluthermal program to recycle plutonium in light water reactor fuel mean that the industry ministry must concede that the method does not make the radioactive waste less dangerous or easier to dispose of, contrary to its repeated claims, the report says.

The central government should also accept its responsibility to dispose of spent fuel. Then it should move ahead to directly dispose of the 44 tons of already separated plutonium by burying it deep in the ground instead of trying to force public acceptance of the use of MOX fuel at nuclear power plants.

"The United States and most of the other countries that operate nuclear power plants avoid the costs and risks of reprocessing simply by moving older spent fuel into air-cooled dry casks when their spent fuel pools fill up," the report says.

If the current plan is carried out and the MOX program continues to be stalled, Japan's total plutonium stockpile will rise to about 100 tons within 10 years--nearly equal to the amount that the United States has produced for weaponry, the report says.

"As the only non-weapon state that reprocesses, Japan is undermining the nonproliferation regime by setting an example that other states interested in a nuclear-weapon option--or even nuclear weapons--can emulate," it says.

The full-text of the proposal is available at:
http://www.asahi.com/special/nuclear_peace/academic/August2013_english.pdf

September 16, 2013

Data transmission from Monju reactor stopped dossier reprocessing

http://mainichi.jp/english/english/newsselect/news/20130916p2g00m0dm035000c.html

TOKYO (Kyodo) -- Data transmission from the Monju prototype fast-breeder reactor in central Japan has been suspended since early Monday, the Nuclear Regulation Authority said.

It was not known immediately whether the trouble was caused in relation to a powerful typhoon that ripped through Japan's mainland on Monday, according to the NRA.

Transmission of reactor monitoring data to the government's Emergency Response Support System stopped before 3 a.m., the NRA said. The NRA is collecting necessary data from the Japan Atomic Energy Agency that operates the reactor.

There are no prospects for restoration of data transmission for now, with the reactor site in Tsuruga, Fukui Prefecture, inaccessible due to mudslides and fallen trees caused by the typhoon, it said.

The Monju reactor has effectively been prohibited from operation because of lax safety management by the operator.

September 17, 2013

Data transmission stopped at Monju reactor

Typhoon cuts off monitoring transmissions from Monju reactor

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201309170043

Fiber-optic cables that allow the Japan Nuclear Energy Safety Organization to monitor the Monju prototype fast-breeder reactor appear to have been damaged in a landslide Sept. 16 caused by powerful Typhoon No. 18, officials said.

The Monju plant, based in Tsuruga, Fukui Prefecture, was already suspended before the typhoon, which killed three people and left more than 120 injured across the nation, made landfall.

The system sends reactor temperatures and pressure readings, as well as data from monitoring posts, to the Japan Nuclear Energy Safety Organization around the clock.

The Nuclear Regulation Authority and the prime minister's office use the information to deal with accidents or problems.

The NRA secretariat told the operator, Japan Atomic Energy Agency, to monitor the data and report any problems directly because it will take more than a week before the fiber-optic cables are repaired.

The system was suspended at 2:55 a.m., and the NRA secretariat was notified at 3:45 a.m., officials said.

Workers in charge of inspections and repairs were unable to enter the reactor compound until around 2:30 p.m. because landslide debris blocked a road to the site. No other damage was reported.

The Monju sodium-cooled fast-breeder reactor has been mostly suspended since a sodium leak in December 1995.

In May, the NRA suspended preparations to resume operations after the operator was found to have neglected the inspection of nearly 10,000 pieces of equipment at the facility.

September 25, 2013

Research to continue at Monju

Govt. plans to continue research at Monju

http://www3.nhk.or.jp/nhkworld/english/news/20130925_36.html

Japan's science ministry has unveiled a plan to run the Monju fast breeder reactor on the Sea of Japan coast for about 6 years before deciding whether to continue further research there.

The ministry on Wednesday submitted to a government working group its plan for the prototype reactor in Tsuruga, Fukui Prefecture.

The facility is shut down, and the Nuclear Regulation Authority has banned preparation for restarting it until new maintenance and management systems are in place.

The plan stresses the importance of securing energy options, and describes Monju as a core facility for research and development.

If the reactor is allowed to restart, the ministry is to run it on an experimental basis for 2 years, and fully operate the facility for about 4 years.

Research there is to focus on how to control Monju's core and handle reactor-cooling sodium.

The plan says the decision on whether to continue research at the facility will be made toward the end of the period of full operation.

But a restart of Monju is nowhere in sight. In addition to safety problems at the reactor, experts are examining what could be an active fault under its compound.

October 4, 2013

Akio Matsumura: Frank von Hippel and M. Takubo on reprocessing

Needless Nuclear Reprocessing: The Bridge to Unnecessary Risk

http://akiomatsumura.com/2013/10/needless-nuclear-reprocessing-the-bridge-to-unnecessary-risk.html

Introduction by Akio Matsumura

I decided to work full time on expanding the conversation on the Fukushima accident and cleanup process because of one reason: nuclear power plant accidents have the ability to alter our land and society for tens of thousands years. We have seen major conflict over the last centuries, but even in the case of World War II, in which 60 million people died, our societies have proved resilient and recovered in a matter of decades, even if permanently altered. A full fuel pool fire would bring us a catastrophe like we've never seen.

The work of Frank von Hippel, a professor at Princeton University and co-founder of the International Panel on Fissile Materials, has brought the issues of reprocessing spent fuel, another aspect of nuclear technology laden with risk, to my attention. Chris Cote*, editor and contributor to this blog, summarizes a* recent report by Frank von Hippel and Masafumi Takubo *and describes the technology's ability to be a bridge to further risk: the creation of plutonium, a nuclear weapon material. I'd like to thank Dr. von Hippel for his help in reviewing this summary for publication here.*

Needless Nuclear Reprocessing:

The Bridge to Unnecessary Risk

Chris Cote

Japan's Other Nuclear Program

Irradiated water continues to flow into the Pacific Ocean from Fukushima Daiichi, three reactors remain radioactive and unapproachable, and a fourth loaded with spent fuel could collapse under its own weight. Amidst this disorder, Prime Minister Shinzo Abe's government has shifted attention away from the cleanup and at the same time is planning to expand Japan's nuclear capabilities by opening the Rokkasho Reprocessing Plant some 270 miles north of the Fukushima power plants.

As made clear by two members of the International Panel on Fissile Materials in a recent *Asahi Shimbun* special report, Japan's reason for pursuing reprocessing (against the urging of the United States) likely has less to do with any fixed goal than it has to do with continuing to follow a tangled web of policies from which they cannot extricate themselves. Pursuing a policy that not only does not solve its targeted problems but leads to nuclear weapons material only because the government lacks an alternative is irresponsible. And now a workable alternative has been identified.
In "Ending Plutonium Separation: An alternative approach to managing Japan's spent nuclear fuel," Masafumi Takubo and Frank von Hippel show how utilities, local governments, and relevant federal agencies find themselves trapped in a complicated set of policies committing Japan to reprocessing as its nuclear spent fuel disposal policy, despite it being ineffective, costly, potentially dangerous, and destabilizing the international nuclear nonproliferation regime. Throughout the report they explain how strong central action can lead Japan to a better alternative that uses air-cooled dry casks to store spent nuclear fuel instead of reprocessing, a method that creates similar levels of waste as originally marked for disposal.

What will the Rokkasho Reprocessing Plant do? If it opens in the next few months as planned — after sixteen years of delays — the plant will take spent nuclear fuel and separate out the plutonium that was created when the original uranium was irradiated by neutrons in the reactor.

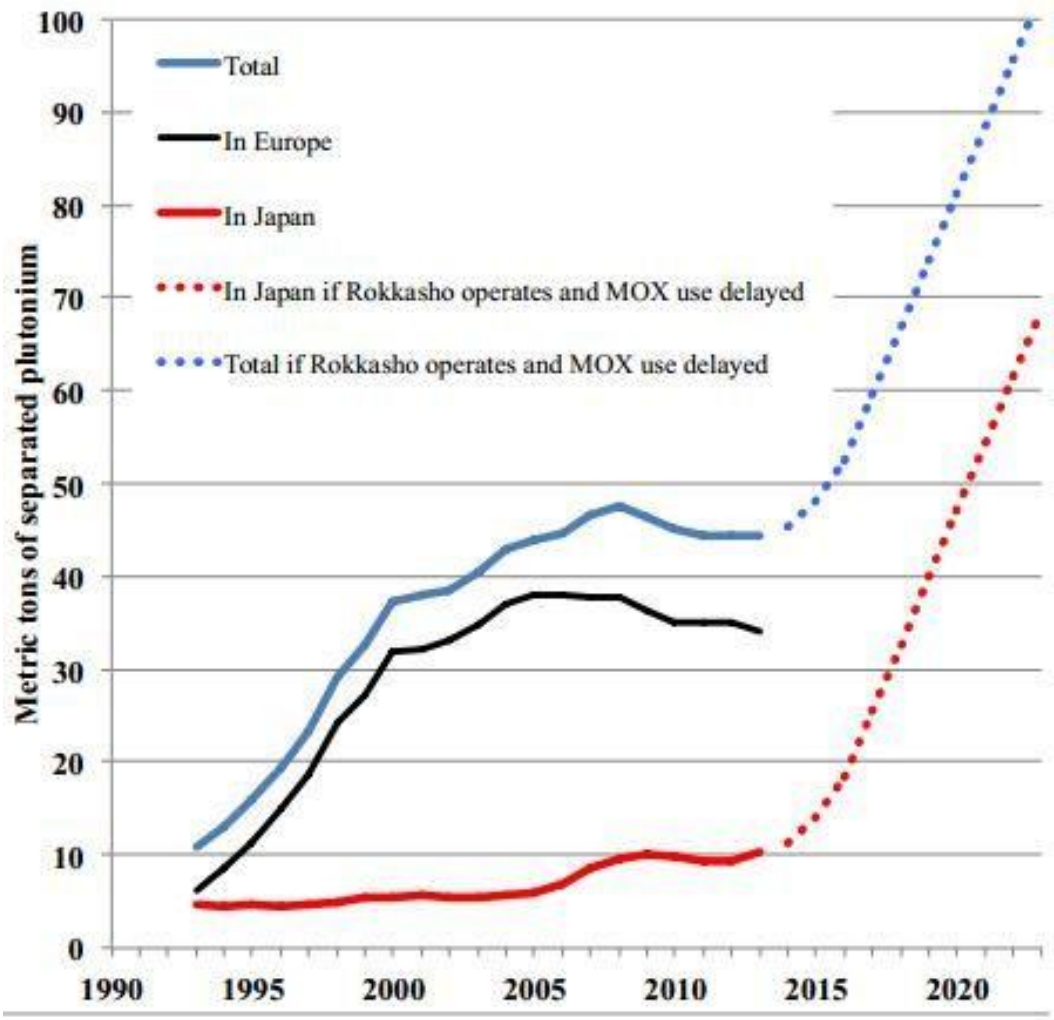
"Plutonium is a nuclear weapon material and separating it makes no sense economically. In spent fuel, it is virtually inaccessible, but separated plutonium is an attractive target for would-be nuclear terrorists. The 8 tons that Japan plans to separate annually would be sufficient to make one thousand Nagasaki-type bombs." -in "**Ending Plutonium Separation".** Read the whole report**.**

What uses does plutonium have? Reprocessing technology has had multiple purposes over its lifetime. Nuclear reprocessing was originally used to separate plutonium for use in nuclear weapons (plutonium doesn't need to be enriched to high levels like uranium-235, the original ingredient in a nuclear reactor, and very small amounts can cause catastrophic damage in a bomb). Countries pursued this path to nuclear weapons following World War II and now there are large separated plutonium stocks worldwide, especially in the United States and Russia. Japan owns 44 tons, a significant amount.

In the late 1960s world uranium reserves were thought to be small and an alternative nuclear fuel was sought. Breeder reactors, so called because they create more plutonium than they use, were developed. Scientists and policy makers thought they had found a cheap, perpetual electricity source. But the reactor technology proved to be unreliable and too expensive to use without heavy government subsidy. As reprocessing became costly, it also became unpopular politically. In 1977 U.S. President Jimmy Carter announced the United States would no longer pursue commercial reprocessing as part of its non-proliferation efforts (specifically to discourage countries such as South Korea). With the failure of commercial breeders, countries decided to use the plutonium in Mixed Oxide (MOX) fuel for ordinary reactors with only a small extension of the fuel resource.

For No Good Reason

The reprocessing programs that continued from the early days of the technology were never economical but persisted from national policies that required the use of reprocessing for waste disposal and were never overturned. Japan's reasons for its reprocessing program seem to follow this trajectory. Japan ostensibly wishes to make more plutonium, a material they already own much of and have had no use for. Japan, like other countries, has no breeder reactors, and use of plutonium in Mixed Oxide (MOX) fuel , has encountered a great deal of public resistance. Japan is the only nonweapon state that reprocesses today but it has signed the nuclear non-proliferation treaty and is not planning to create weapons. Even if it did have an immediate use for plutonium, Japan already owns 44 tons of it. Takubo and von Hippel explain that that is enough to make more than 5,000 Nagasaki-type nuclear explosives.



Japan's Stockpile of Separated Plutonium
(Takubo and von Hippel, 2013, pg. 8)

For a program with no use, reprocessing has several serious actual and potential consequences for Japan.

1. Reprocessing is expensive. According to Takubo and von Hippel, over the course of its lifetime, Rokkasho will cost Japanese taxpayers 8 trillion Yen more than storing the spent fuel in dry casks.
2. It is allowing the government to delay creating an effective nuclear waste policy program (either interim or long term). Spent fuel is piling up across Japan, both at Rokkasho, which in its delay period has accumulated 3000 tons of spent fuel to be reprocessed, and at all other reactor sites, several of which will reach storage capacity in less than a decade if Japan's nuclear program comes back online. Even if Rokkasho does begin reprocessing spent fuel, it will create new streams of waste, negating its use as a disposal tool.
3. Running a reprocessing plant has direct costs for humans and water sources, as evidenced by the radiation accident experienced by Russians near the Mayak plant and increased radiation in the North Sea produced as effluent run off by France's La Hague reprocessing facility.
4. A restart of the Rokkasho Reprocessing Plant threatens to destabilize the non-proliferation regime. Countries may see Rokkasho coming online as a green light for their own reprocessing programs. The abundance of plutonium resulting from a surge in reprocessing, especially in countries employing the technology for the first time, makes appealing targets for terrorists. Specifically, South Korea has been pointing to Japan as a precedent or other legitimating reason to begin separating plutonium as North Korea continues to rattle its (nuclear-tipped) sabers next door.

Unnecessary Risk

The use of nuclear technology forces us to accept and live with two serious risks: A nuclear power plant accident, in which the worst case scenario is an unstoppable spent fuel pool fire, and the use of a nuclear weapon, in which the worst case scenario is a worldwide deployment of the existing nuclear arsenal.

Reprocessing is the bridge between nuclear power plants and nuclear weapons. Fukushima showed us the unimagined and undiscussed dangers of nuclear power plants. Japan has already experienced the damage inflicted by nuclear weapons. Rather than remaining stuck with policies popular in the 1960s, Japan needs to reroute its policies away from reprocessing toward more effective spent fuel disposal. Fortunately, Takubo and von Hippel provide Japan's policy makers with an alternative to operating Rokkasho. Although the Japanese will not want to embarrass themselves, the central government should declare Rokkasho a failure for all the reasons listed above, disentangle the web of policies that has trapped all stakeholders, and establish a politically, economically, and environmentally responsible framework for the safe interim storage of Japan's spent fuel while Japan, like all other countries with nuclear power plants, begins looking for a long term solution.

October 15, 2013

JNF's new furnace

Test furnace shown at nuclear fuel recycle plant

http://www3.nhk.or.jp/nhkworld/english/news/20131015_37.html

The operator of a nuclear fuel recycling plant in northern Japan has shown a new test furnace for processing highly radioactive wastewater.

Japan Nuclear Fuel recently built the facility in Rokkasho Village to improve technology for mixing nuclear wastewater with melted glass and solidifying it.

The firm showed media the nearly 3-meter-high test furnace in the facility on Tuesday.

The firm's engineers say they improved the structure of furnace by more sharply inclining its bottom so that melted glass can flow more easily. They also added electrodes to make temperature control easier.

They say the bottom of the old furnace often clogged up.

Japan Nuclear Fuel plans to start using the test furnace in November and replace the old one in 4 years.

In May, the operator said it completed all pre-startup tests before beginning nuclear fuel recycling. But it is unclear when the facility will be put to commercial use.

December 11, 2013

Tokai plant doesn't need to wait for safety screening

NRA to approve restart of reprocessing facility

http://www3.nhk.or.jp/nhkworld/english/news/20131211_29.html

Japan's nuclear regulator plans to approve a partial restart of a facility for reprocessing spent nuclear fuel before it clears safety screening under new regulations.

The Nuclear Regulation Authority says it's allowing the restart to make plutonium and other highly radioactive waste in the facility solid and more stable.

The authority said on Wednesday that it plans to allow the government-backed Japan Atomic Energy Agency to operate part of the plant in Tokai Village, about 100 kilometers north of Tokyo.

The decision comes after the agency sought permission to restart the facility soon, saying that keeping the waste in liquid form involves high risks.

NRA commissioners said the facility's stockpiles of plutonium solutions and other liquid waste will be made safer when reprocessed into solids.

They came up with a plan to allow part of the facility to run for **5 years before checking is done under the enhanced regulations.**

The facility stores 3.5 cubic meters of solutions containing plutonium and more than 400 cubic meters of highly radioactive liquid waste. NRA secretariat officials say reprocessing the plutonium solutions into powder will take about 2 years, and turning other liquid waste into glass 21 years.

The new regulations are to take effect on December 18th. The NRA is to give formal approval after confirming that the agency can ensure stable reprocessing at the plant.

December 18, 2013

New rules for reprocessing too

New rules for spent fuel reprocessing in effect

http://www.japantimes.co.jp/news/2013/12/18/national/new-rules-for-spent-fuel-reprocessing-in-effect/#.UrLuTSfij9k

Kyodo

Tougher safety standards were introduced Wednesday for spent nuclear fuel reprocessing plants and other facilities handling nuclear fuel, based on the lessons learned from the 2011 Fukushima nuclear disaster.

The new regulations cover 247 facilities, including a spent fuel reprocessing plant in the village of Rokkasho, Aomori Prefecture.

The problem-prone plant, which is expected to play a key role in Japan's fuel recycling strategy, is designed to reprocess spent uranium fuel and reuse the extracted plutonium and uranium as reactor fuel.

Plant operator Japan Nuclear Fuel Ltd. plans to apply soon for the Nuclear Regulation Authority's safety checks to start the long-delayed process of getting the plant in operation.

Under the new standards, spent fuel reprocessing facilities and nuclear fuel fabrication plants will be required to take steps to deal with criticality incidents, hydrogen explosions and other severe situations that could result in the release of radioactive material.

The facilities will also be required to enhance their safeguards against earthquakes and tsunami, the direct causes of the disaster at the Fukushima No. 1 nuclear power station.

Universities and research institutions with reactors will also be required to reinforce measures against natural disasters, and prepare evacuation procedures for researchers and others visiting the site.

The move is the latest in a series of regulation revisions carried out by the NRA after the Fukushima crisis revealed Japan's safety requirements to be ineffective.

The Rokkasho plant was initially expected to be completed before 2011, when the Fukushima crisis started, but a series of problems, including leakage of high-level radioactive waste liquid, has delayed the schedule.

Japan Nuclear Fuel says the facility is designed to reprocess 800 tons of spent fuel per year, extracting about 8 tons of plutonium in the process.

See also:

New safety rules for nuclear facilities introduced

http://www3.nhk.or.jp/nhkworld/english/news/20131218_05.html

December 20, 2013

Work to be done on Rokkasho plant

Work on Rokkasho fuel reprocessing plant to 'completed' by October

http://www.japantimes.co.jp/news/2013/12/20/national/work-on-rokkasho-fuel-reprocessing-plant-to-completed-by-october/#.UrRC_Sfij9k

Kyodo

AOMORI – Japan Nuclear Fuel Ltd. said Thursday it expects its spent fuel reprocessing plant in Rokkasho village, Aomori Prefecture, to pass the state's safety assessment and be ready for operation in October 2014.

The plan was explained to local governments concerned, as the operator is seeking to apply for the Nuclear Regulation Authority's safety screening of its experimental reprocessing plant possibly later in the month.

A Japan Nuclear Fuel official said October 2014 will mark the plant's "completion" and its actual operation will start after securing local consent.

The plant is tasked with playing a key role in Japan's fuel recycling policy, which aims to reprocess spent uranium and reuse the extracted plutonium and uranium as reactor fuel.

But whether the schedule will be realized largely depends on the progress of the safety screening process.

Japan has revamped safety requirements for commercial nuclear reactors and facilities handling nuclear fuel since the 2011 Fukushima disaster, which proved past regulations ineffective.

Under the new standards, spent fuel reprocessing facilities are required to take measures to deal with severe accidents such as criticality incidents and hydrogen explosions. They are also required to enhance protection against earthquakes and other natural disasters.

Japan Nuclear Fuel said costs to install additional steps to counter severe accidents and earthquakes will reach ¥30 billion.

The company started building the plant in 1993, and a trial operation began in March 2006. But its completion has been repeatedly postponed.

January 5, 2014

Reprocess or store?

SYMPOSIUM: Japan's massive stockpile of plutonium casts shadow over nonproliferation efforts

http://ajw.asahi.com/article/behind_news/social_affairs/AJ201401050011

Nuclear policy experts from around the world discussed a broad array of issues concerning the use of plutonium in nuclear power generation at a recent symposium in Tokyo.

The symposium, titled "Managing Spent Fuel: To Reprocess or Store," was jointly sponsored by The Asahi Shimbun Co. and Princeton University. Discussions revolved around the wisdom of Japan's energy policy of utilizing plutonium for power generation under the government's nuclear fuel recycling program.

The symposium was comprised of three sections. The experts first addressed the implications of Japan's policy of reprocessing all spent nuclear fuel for international efforts to prevent nuclear proliferation. Next, the main topic was the economics and safety of reprocessing spent nuclear fuel. In the final section, the participants debated how to overcome obstacles to a policy change.

NEIGHBORING COUNTRIES SUSPECT JAPAN HAS HIDDEN PLUTONIUM AGENDA

Japan's massive stockpile of plutonium and what should be done with it was the topic of discussion for the first section of the symposium. Steve Fetter, a former U.S. White House official during the Obama administration, pointed out that if the reprocessing plant in Rokkasho, Aomori Prefecture, starts operation, Japan's stockpile of plutonium will keep growing despite the lack of a plausible plan to use the material.

Japan should stop reprocessing spent nuclear fuel, or, if that is not possible, it should at least make clear its plan to use plutonium and reduce the amount of plutonium to the minimum necessary, Fetter argued in opening the debate.

Japan has nearly 10 tons of plutonium on its own soil alone. That is enough to make 1,500 or so nuclear warheads. In addition to the risk of terrorists attacking the storage facilities and stealing plutonium, if Japan continues to accumulate plutonium without any economic rationale, and without firm plans for its immediate use in power generation, this can sow doubts about Japan's intentions, Fetter said.

Countries often make worst-case assumptions about the intentions of their neighbors. They assume the worst, and base their assessments and defense planning solely on capabilities, Fetter noted.
He added: "I have attended meetings elsewhere in East Asia where participants questioned the nature of Japan's plutonium program. They suggested that it was a type of nuclear deterrent—a signal that Japan could quickly build large numbers of nuclear weapons if it chose to do so. So that is one concern with Japan's reprocessing program: that neighboring countries might believe that Japan has accumulated a large stockpile of plutonium in part to provide a nuclear weapon option."

"If other countries perceive a growing Japanese plutonium stockpile as a latent nuclear weapon capability, this will contribute to instability in East Asia, and it will undermine Japan's international reputation," Fetter noted.

Fetter urged Japan to play a leading role in nuclear nonproliferation.

But Japan, which does not possess nuclear weapons, has been consistently promoting the peaceful use of nuclear power. It has long been regarded as a positive contributor to international efforts to prevent nuclear proliferation under the Nuclear Nonproliferation Treaty (NPT).

Yoriko Kawaguchi, who served as foreign minister and environment minister, ruled out the possibility of Japan arming itself with nuclear weapons.

"Going nuclear would mean withdrawing from the NPT and facing international sanctions like North Korea and Iran," said Kawaguchi. "Japanese people would never support (Japan's nuclear armament)," she contended.

Yukio Sato, a former permanent representative of Japan to the United Nations, agreed with Fetter's argument that Japan should reduce its stockpile of plutonium as soon as possible. But Sato stressed that Japan's current lack of a feasible plan to use its plutonium is an "unintended situation," created by the devastating accident that unfolded at the Fukushima No. 1 nuclear power plant following the 2011 earthquake and tsunami disaster.

As a result of the disaster, all nuclear reactors in Japan are idled, Sato explained. "It is not possible to craft a new plan to use plutonium immediately, but when such a plan is worked out in the future, Japan will return to the principle of holding no more plutonium than absolutely necessary," he said.
The experts also discussed whether Japan's fuel reprocessing program is negatively affecting the efforts for nuclear nonproliferation.

Japan is the only country without nuclear arms that continues to reprocess spent nuclear fuel. Countries that are disgruntled about Japan's privilege--South Korea, for example--are calling on the United States to allow them to do the same.

Fetter asserted that it is difficult to maintain the double standard that allows only Japan to reprocess spent fuel. He expressed concerns that an increase in the number of countries with plutonium would lead to nuclear proliferation and pose a security threat.

Kawaguchi countered this argument by saying Japan needs to have a nuclear fuel recycling system that involves reprocessing spent fuel from the viewpoint of reducing the volume of high-level radioactive waste and securing sufficient energy sources. There is no guarantee that Japan's move to stop reprocessing will persuade other countries to give up their plans to go nuclear, she said.

"It would be more effective to take steps to enhance the existing international framework for nuclear nonproliferation," she said.

As concrete steps in this direction, Kawaguchi called for promoting nuclear disarmament, expanding inspections by the International Atomic Energy Agency (IAEA) and enforcing more rigorously the international sanctions on countries that have violated the NPT.

Sato proposed that Japan should fully disclose information concerning the causes of the Fukushima nuclear disaster and the process of decommissioning the reactors at the plant, while demonstrating its commitment to transparency in its nuclear energy policy. Pointing out that there is solid mutual trust between Japan and the United States built through years of cooperation for peaceful use of atomic energy, Sato urged the U.S. government to explain Japan's position to the countries seeking to be allowed to reprocess spent nuclear fuel so that they understand the situation.

REPROCESSING AND DISPOSAL SHOULD BE COMBINED

In the second section of the symposium, the main topic was the economics and safety of reprocessing. The experts discussed the value of plutonium and the cost of using mixed oxide (MOX) fuel, which is composed of plutonium and uranium.

A study group of the Japan Atomic Energy Commission headed by Tatsujiro Suzuki, vice chairman of the commission, estimated the cost of nuclear fuel recycling based on so-called pluthermal power generation, which burns MOX fuel with ordinary reactors, to be 1.98 yen per kilowatt-hour. That is about two times higher than the cost of simply disposing of spent nuclear fuel, which was estimated at about 1 yen.

Suzuki said reprocessing all spent nuclear fuel in Japan will be costlier than direct disposal by 7 to 8 trillion yen ($67.2 billion to $76.8 billion).

He also referred to Japan Nuclear Fuel Ltd.'s estimate that shows using plutonium to generate power doesn't make economic sense. According to the estimate, at the current price of uranium, using one gram of fissile plutonium to produce electricity costs Japan $40 more than using uranium.

"There is no doubt that reprocessing spent fuel to use plutonium for power generation is costlier than ordinary power generation and disposal of spent fuel," said Suzuki.

Hajime Yamana, who is chairman of the International Research Institute for Nuclear Decommissioning and was another member of the study group, said reprocessing is more expensive than disposal, but only by about 10 percent, if the total costs, including those of building nuclear power plants, are compared.

"In reprocessing, one MOX fuel rod can be made by using eight spent fuel rods," Yamana said. "Fuel recycling is better from the viewpoint of reducing the amount of stored spent fuel. The question is how the public feels about the cost increase, but I personally think it is acceptable."

Klaus Janberg, a nuclear engineering consultant who was involved in reprocessing and intermediate storage projects at a major German power company, referred to the estimate that producing MOX fuel alone costs more than three times as much as uranium fuel in Germany. Germany once had started to build a reprocessing plant at home, but abandoned it in 1989 for cost reasons and public opposition. Another reason was that the breeder program was stalled, according to Janberg.

"It was the electric utilities themselves who pulled the plug," he said. Japanese people should know that MOX fuel is very costly and without a continuous breeder program, which does not exist, it simply makes no sense, he argued.

How about the safety of a reprocessing plant? Gordon Thompson, executive director of the Institute for Resource and Security Studies of the United States and an expert in risks related to nuclear facilities, maintained that it would be dangerous to gather spent fuel from all nuclear power plants in Japan at the Rokkasho reprocessing plant in Aomori Prefecture.

Each of the three storage pools at the plant has a radioactive cesium level of up to 5,000 quadrillion becquerels, according to Thompson. He also drew attention to radioactive cesium in tanks of liquid waste. A major accident or a terrorist attack at the plant, while unlikely to occur, would cause immeasurable harmful effects that history would never forget, said Thompson.

The four experts didn't agree on whether Japan should pursue reprocessing, but they basically agreed that reprocessing all spent nuclear fuel would not be a wise strategy. They also concurred that Japan should widen the scope of its policy options by introducing direct disposal and increasing intermediate storage.

Yamana added that in assessing a nuclear fuel recycling policy it is important to pay attention to relationships with the local communities and international society, as well as to economic and safety issues. He maintained that the most realistic approach to dealing with the issue of radioactive waste would be a mix of options.

Noting that the government has already poured an enormous amount of taxpayer money into the Rokkasho reprocessing plant, he said the government should secure consumption of MOX fuel at certain facilities while operating the Rokkasho plant in cooperation with Aomori Prefecture. It should then combine reprocessing with direct disposal and intermediate storage for a more balanced approach, he explained.

With the future of nuclear power generation in Japan unclear, Suzuki argued, the government should adopt a policy that uses both reprocessing and direct disposal. The Japan Atomic Energy Commission has already concluded that the government's nuclear policy should be more flexible, he added. But all these facts and arguments have yet to translate into an actual policy change.

DIFFICULTY OF CHANGING POLICY AND POSSIBLE MEASURES

The central topic for discussions in the third section was how to overcome the difficulty of changing the policy.

Abandoning the policy of promoting nuclear fuel recycling could destroy the trust between the central government and Aomori Prefecture, which has accepted spent nuclear fuel from around the nation for reprocessing. William Walker, a professor at St. Andrews University who has been studying Britain's nuclear power policy, opened the debate by saying the situation in Britain is similar to that in Japan. He proceeded to offer a cautionary tale from Britain's point of view.

In the 1970s, Britain launched a project to build a fuel reprocessing plant in Sellafield on the coast of the Irish Sea under the assumption that fast-breeder reactor technology would reach the stage of practical use sooner or later. The British government terminated the fast-breeder reactor program in 1994, mainly because of economic reasons, but the same year operations began at the Sellafield reprocessing plant. Plutonium extracted from spent fuel at the plant has hardly been used.

"Nobody knows what to do with the 100 tons of plutonium that have been left behind," said Walker. The reprocessing plant is very important for the local economy and job creation. Politicians don't want to shut down facilities that are creating jobs, Walker pointed out. They only paid attention to advice from the industry and protected only the vested interests of reprocessing, he added.

Motohisa Furukawa, former minister of national strategy of Japan, mapped out what was named an "innovative energy and environment strategy" in autumn last year, when the Democratic Party of Japan was still in power.

While proposing to phase out nuclear power generation in Japan by the end of the 2030s, the strategy called for continuing the nuclear fuel recycling program in consideration of Aomori Prefecture. The two proposals are certainly inconsistent, Furukawa admitted. "But we have to honor the promises the successive administrations have made to Aomori Prefecture," he said.

The strategy was aimed at “changing (the nuclear power policy) gradually by unraveling, bit by bit, the tangled web of vested interests concerning nuclear power generation that has been formed over half a century,” he explained.

With this situation in mind, Frank von Hippel, a professor of Princeton University, proposed that spent nuclear fuel be stored, for the time being, in what are called dry casks within the nuclear power plants instead of reprocessing. Even if all of the some 3,000 tons of spent nuclear fuel at the Rokkasho reprocessing plant are returned to the plants which produced them, they can be safely stored if only an average of 20 dry casks’ worth of storage capacity is added to each plant, according to von Hippel. The government would then need to provide sufficient compensation to Aomori Prefecture, he said.

Terminating the reprocessing program would save Japanese taxpayers some 7 trillion yen over time, he said.

The participants also discussed the issue of a final disposal site for radioactive waste. Japan's nuclear energy program is sometimes described as “an apartment without a bathroom.” Hiroya Masuda, former minister of internal affairs and communications, said there has been no sufficient understanding of or consensus on the need and safety of final disposal of radioactive waste among the Japanese people.

The government should take the responsibility for tackling the challenge of selecting and narrowing down candidate sites from the scientific point of view, said Masuda, who heads a working group on nuclear waste at the Ministry of Economy, Trade and Industry. Since the process takes several decades even if things go smoothly, creating a system to review and reconsider related policy decisions is essential, he argued.

As of now, about 70 percent of national land is scientifically suitable for locating a final disposal site, according to Masuda. The scope of candidate areas will be narrowed further from the viewpoints of volcanoes, geographical features and underground water. Should the areas that have taken the risk of hosting nuclear power plants also take on the risk of having a final disposal site?

It would be better from the viewpoint of fair burden sharing to spread out the risks of having a nuclear plant, an intermediate storage site and a final disposal site, he contended.

Furukawa compared the issues of spent nuclear fuel and final disposal of radioactive waste to the problem of a growing budget deficit. Failing to find a solution to these issues now, Japan has been shifting the risks and costs to future generations. It is vital for people belonging to this generation, which has experienced the Fukushima nuclear disaster, to ask themselves some serious questions about their way of life, he said.

FACT FILE: JAPAN HAS 44 TONS OF PLUTONIUM WITHOUT PLAN FOR ITS USE

Japan’s policy of promoting nuclear fuel recycling has reached a dead end.

Fast-breeder reactor technology was supposed to play the central role in the nuclear fuel recycling program Japan has been promoting since the 1960s. Assuming that the world would eventually run out of uranium, the government developed a plan to extract plutonium from spent nuclear fuel at a reprocessing plant for use in fast-breeder reactors, which are supposed to produce more fuel than they consume.

But the prices of uranium have not soared, while the difficulty of developing practical fast-breeder reactor technology has become increasingly clear. This approach has also raised concerns about nuclear proliferation.

The United States and many other countries have long pulled the plug on their fuel reprocessing and recycling programs. But Japan has so far not changed its policy and entrusted Britain and France with reprocessing spent nuclear fuel to extract plutonium in large amounts.

Japan's Monju prototype fast-breeder reactor, located in Tsuruga, Fukui Prefecture, has been offline for years with no prospect of restarting operation. As a result, the government has bet on so-called pluthermal power generation, which burns MOX fuel, composed of plutonium and uranium, in ordinary light-water reactors, as the key technology for fuel recycling. But only four reactors had begun to produce electricity with MOX fuel before the reactor meltdowns at the Fukushima No. 1 nuclear power plant.

All the nuclear reactors in Japan were shut down after the accident, and there is no prospect for crafting a realistic plan to use the stockpile of plutonium. Japan now has some 44 tons of plutonium at home and abroad.

Under these circumstances, the construction of the reprocessing plant in Rokkasho, Aomori Prefecture, being built by Japan Nuclear Fuel Ltd., is approaching completion. If it starts running at full capacity, the plant will produce about seven tons of fresh plutonium every year.

Japan's fuel recycling program is based on the policy of reprocessing all spent fuel and doesn't allow direct disposal of spent fuel. With 3,000 tons of spent fuel stored at the Rokkasho plant and additional 14,000 tons at 17 nuclear plants nationwide, there is little room left for storing more spent fuel. The location of a final disposal site for high-level radioactive waste produced through reprocessing has not been selected yet.

January 8, 2014

Time to admit problems linked to nuclear fuel cycle project

Editorial: Gov't should acknowledge limits of nuclear fuel cycle project

http://mainichi.jp/english/english/perspectives/news/20140108p2a00m0na010000c.html

Japan Nuclear Fuel Ltd. (JNFL) has applied with the government's Nuclear Regulation Authority (NRA) for safety inspections of its so-called spent nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture, which is the core of the nuclear fuel cycle project, and other relevant facilities, under new nuclear power regulatory standards. The company is aiming to complete the plant in October 2014.

The basic plan on energy, which the Cabinet of Prime Minister Shinzo Abe is set to approve later this month, states that the government will steadily promote the nuclear fuel cycle project, thus expressing firm support for the start of the reprocessing plant.

The project, in which plutonium is extracted from spent nuclear fuel and reused in nuclear reactors, has been part of Japan's energy policy for many years.

However, there are problems involving the project from the viewpoint of safety, economic efficiency and nuclear non-proliferation. **The project would be unnecessary if the government is to decrease Japan's reliance on atomic power**. The government should put an end to the nuclear fuel cycle policy and disapprove of the operation of the reprocessing plant.

The construction of the reprocessing plant got under way in 1993 and was to be completed in 1997. However, the completion of the work has been postponed 20 times because of a series of technical problems. The construction costs, which were initially estimated at about 760 billion yen, have snowballed to around 2.2 trillion yen.

Since the plant is supposed to deal with a massive amount of radioactive substances, the new regulatory standards require its operator to be prepared for powerful earthquakes, high tsunami and severe accidents and terrorist attacks to the same degree as nuclear power stations. JNFL estimates that additional measures it needs to take to meet the new standards will cost it approximately 30 billion yen.

An 85-kilometer fault lies on the outer edge of a continental shelf off the Shimokita Peninsula, where the reprocessing plant and other nuclear-related facilities are concentrated. While JNFL and other entities deny that the fault is active, the NRA is currently surveying the subsurface structure of the Shimokita Peninsula. Depending on the results of the survey, JNFL could be required to take further countermeasures against possible powerful temblors.

Even if the operation of the plant starts, there is currently no reactor where extracted plutonium can be burned. The prototype fast-breeder reactor Monju, which uses plutonium, remains idled following revelations that mechanics failed to sufficiently inspect it. The NRA has not given the green light for work to prepare for the restarting of Monju. Nor are there any prospects that a project to burn plutonium in conventional nuclear reactors can be put to practical use in the foreseeable future.

If Japan is to stockpile a massive amount of plutonium which can be used as a material for nuclear weapons, it would raise grave concerns in the international community, and increase the risk of terrorist attacks.

Questions also remain as to the economic efficiency of the nuclear fuel cycle project. A subcommittee of the Japan Atomic Energy Commission concluded in 2012 that disposing a full amount of spent nuclear fuel is cheaper than fully reprocessing such radioactive waste or a combination of disposal and reprocessing.

However, if Japan is to abandon the nuclear fuel cycle project, it would invite protests from Aomori Prefecture that has allowed spent nuclear fuel to be stored in its territory on the assumption that the radioactive waste will be reprocessed. Therefore, the national government has no choice but to provide a detailed explanation to local bodies hosting relevant facilities as well as the public to seek a consensus.

In Japan, most of the spent nuclear fuel is being stored in pools, but so-called dry storage, or storing radioactive waste in air-cooled metal containers, is much safer. Such being the case, dry storage could be a temporary method of storing such waste until final disposal.

Furthermore, one cannot help but wonder whether electric power consumers, who benefit from nuclear plants, should bear a certain burden of dealing with spent nuclear fuel instead of leaving the matter entirely to the communities hosting atomic power stations. In-depth debate should be held on how the nation should share the burden of storing and disposing of radioactive waste.

January 28, 2014

NRA and Rokkasho screening

NRA outlines points of Rokkasho plant screening

http://www3.nhk.or.jp/nhkworld/english/news/20140128_23.html

Japanese nuclear regulators are urging the operator of a spent nuclear fuel reprocessing plant to explain in detail how well it's prepared for disasters and accidents.

The operator is hoping to launch the country's first reprocessing plant in Rokkasho, northern Japan in October.

The Nuclear Regulation Authority met with officials of Japan Nuclear Fuel Limited for the 2nd time on Tuesday.

The NRA officials outlined a wide range of points of their safety screening procedures for the plant.

They include a detailed picture of the plant's vast underground structure, and the results of a survey of an offshore fault extending 84-kilometers.

The operator was asked to explain how it reviewed its estimates for earthquake and volcanic activities following the March 11th, 2011 disaster.

It was also pressed to outline measures to deal with fires, explosions, chemical leaks and other disasters unique to a fuel reprocessing plant.

Japan Nuclear Fuel Limited applied in early January for the assessment to confirm that the plant meets the government's new stringent safety guidelines.

The Rokkasho plant will play a key role in Japan's nuclear fuel recycling policy. But it's unclear how long the assessment will take, as the NRA plans to review the safety measures for each stage of the reprocessing work.

February 2, 2014

Reprocessing: Q & As

News Navigator: How is nuclear waste reprocessed?

http://mainichi.jp/english/english/perspectives/news/20140202p2a00m0na001000c.html

Japan Nuclear Fuel Ltd. (JNFL) applied for a safety inspection of a nuclear waste reprocessing plant in January. The Mainichi answers common questions readers may have about nuclear waste reprocessing.

Question: What kind of facility is the JNFL plant?

Answer: A giant chemical factory to extract reusable resources like uranium and plutonium from spent nuclear fuel. First, the spent fuel is cooled in a pool at the factory for around three years to reduce its radioactivity. Afterwards, it is cut from four-meter fuel rods into pieces of around three to four centimeters. Nitric acid is then used to separate uranium and other components from the fuel, and next the nitric acid is evaporated, while the uranium and other components are pulverized. Other steps are also involved, and overall the process is a technically difficult one. Problems like damage to the cutter that is used to slice the fuel and the clogging of pipes all have to be overcome.

Q: What happens to the waste that the plutonium and uranium are extracted from?

A: Since it cannot be used as a resource, it is processed as "nuclear waste." The waste is liquid and emits high levels of radiation that are fatal even at short-term exposure. To make it easier to store, the liquid is mixed with heated glass at the factory and then put into stainless steel containers. According to JNFL, this process reduces the volume of waste to as much as one third of what it was in liquid form.

Q: If it's glass, isn't it breakable?

A: Glass is resistant against water and to deterioration. JNFL points to glass artifacts uncovered from ancient Rome and other sites that retain their original beauty as evidence of glass's strength.

Q: What is the fate of this glass-encased nuclear waste in the end?

A: Ultimately it has to be buried deep underground, to keep it away from people. The Japanese government has been seeking candidate locations for this since 2002, but so far no local municipality has agreed to have its land surveyed as a potential candidate. For this reason, last year the national government changed its policy from seeking volunteers to choosing candidates locations itself.

The policy of using nuclear power has been criticized as being like "a home without a toilet." Even if the JNFL nuclear waste reprocessing plant begins its operations, the problems with nuclear power cannot be solved overnight. (Answers by Takuji Nakanishi, Science & Environment News Department)

February 13, 2014

What about Monju?

Abe: Development of Monju reactor not smooth

http://www3.nhk.or.jp/nhkworld/english/news/20140213_38.html

Japan's Prime Minister Shinzo Abe says the development of the prototype fast-breeder reactor, Monju, is not making smooth progress.

Abe told the Lower House budget committee on Thursday that the government must reconsider its policy. He indicated that it will consult with the ruling parties in drafting a new basic energy plan.

On the nuclear recycling policy, Abe said the principle of possessing no unnecessary plutonium must be firmly maintained.

He said Japan will continue to make plutonium use more transparent. He said the country will contribute to nuclear non-proliferation efforts and promote peaceful use of atomic energy.

February 17, 2014

New role for Monju reactor?

Troubled Monju prototype reactor may be headed for research role

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201402170057

A key component of Japan's nuclear fuel recycling project, which has been plagued by problems over the past 20 years, will instead focus on research to reduce the volume of nuclear waste, according to a high-ranking executive of the ruling Liberal Democratic Party.

The Monju prototype fast-breeder reactor in Tsuruga, Fukui Prefecture, had been considered vital in the government's plan to recycle spent nuclear fuel. However, a series of safety problems at the reactor have halted operations since it started up in 1994, including a fire caused by a huge leak of sodium in 1995.

"I have given instructions to party officials to consider looking into research to reduce the volume of highly radioactive waste and shortening the period over which those materials remain dangerous," Sanae Takaichi, the LDP policy chief, said about Monju's role on a program broadcast over Japan Broadcasting Corp. (NHK) on Feb. 16.

There is, as yet, no final repository for the highly radioactive waste that is a byproduct from nuclear power generation. That situation has been criticized as being similar to "a condominium with no toilets."

"It is possible to reduce the volume of such waste to one-quarter and shorten the period the materials are a danger to one-10th the current levels," Takaichi said on the NHK program. "Research and development will become another part of the economic growth strategy."

If the goal to shorten the period the materials are dangerous is achieved, the waste would become harmless to humans in about 10,000 years rather than the current estimate of 100,000 years.

In the draft of a basic energy plan compiled in December by the Ministry of Economy, Trade and Industry, mention was made of research and development to reduce the amount of nuclear waste. Takaichi's comments are an indication that further efforts will be made to strengthen the research capabilities in the plan, which will determine the mid- to long-term course of the nation's energy policy.

"I believe the economy minister will present the draft to the ruling coalition in about one week," Takaichi said regarding the basic energy plan. "We hope to finalize the plan before the end of the current fiscal year."

February 25, 2014

Monju: Gov't should think twice

Time to shutter Monju

http://www.japantimes.co.jp/opinion/2014/02/25/commentary/time-to-shutter-monju/#.Uw73LoXrV1s

The long-stalled project to commercialize fast-breeder reactor technology has been kept alive by the Abe administration in its plan for the nation's new basic energy policy. Thus the government once again has missed the opportunity to shutter the Monju prototype reactor — which has been inoperative for most of the past two decades — and to rethink its pursuit of the nuclear fuel cycle based on reprocessing of spent nuclear fuel for consumption at the fast-breeder reactor and other nuclear power plants.

Although the plan says the government will push for a "thorough reform" of Monju's operator, the Japan Atomic Energy Agency, and aim to wrap up the fruits of its research, the track record of the project's history raises serious doubts about its prospect.

The fast-breeder reactor has been touted as "dream" nuclear energy technology that produces more plutonium than it consumes — supposedly a boon for the resource-scarce Japan. But most other nations around the world have given up on commercializing the technology due to technical difficulties, including those involved in the use of sodium as coolant, and the massive costs involved.

Japan spent nearly ¥1 trillion on the Monju prototype reactor in Tsuruga, Fukui Prefecture, but the plant has been hit by a series of troubles after it first reached criticality in 1994, including a sodium coolant leak and a subsequent fire the following year and its operator's attempt to cover up the extent of the accident.

Last year, revelations of safety inspection failures prompted the Nuclear Regulation Authority to issue an order to halt preparatory work for its restart. While the prospect for its future operation remains dim, it costs ¥20 billion each year just to maintain the facility.

Monju has been the core component of the government plan to reprocess spent nuclear fuel from the nation's nuclear reactors into plutonium-uranium mixed-oxide (MOX) fuel to be consumed again for nuclear power generation.
But the path of the nuclear fuel cycle program has been fraught with a series of setbacks, delays and doubts.

The operation of Monju has been halted for much of the time since 1995, and completion of a spent nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture, has been delayed for years due to a host of technical glitches and other problems, with its construction costs having already tripled to around ¥2 trillion.

As the Monju project has stalled, the government has pushed for the so-called pluthermal program, in which MOX fuel would be used at ordinary light-water reactors at nuclear power plants, as a stopgap measure to keep up the quest for the nuclear fuel cycle.

But while the fast-breeder reactor can keep using recycled fuel after repeated reprocessing, MOX fuel used at light-water reactors can be reprocessed only once more at most for reuse at such reactors — a cost-inefficient program given the massive expense needed for reprocessing of spent fuel.

Before the March 2011 triple meltdowns at Tokyo Electric Power Co.'s Fukushima No. 1 nuclear power plant, four nuclear power plants in Japan, including the Fukushima plant, had started using MOX fuels after several years of delay. The restart of some MOX-capable reactors are now under safety review by the Nuclear Regulation Authority after most of the nation's nuclear power plants were shut down in the wake of the Fukushima disasters.

Meanwhile, Japan already possesses a total of 44 tons of plutonium — a product of past reprocessing either at experimental domestic facilities or at overseas facilities using spent fuel from domestic nuclear power plants.

To dispel international fears of proliferation of nuclear materials, Japan, as the sole nonnuclear power that engages in commercial operation to reprocess spent fuel, has pledged that it will not own any plutonium that has no specific use. But the government's scenario of consuming plutonium stockpiles as MOX fuel at up to 18 reactors at nuclear power plants around the country has been thrown in doubt by the post-Fukushima situation.

The start of operations at the Rokkasho reprocessing plant will only produce more plutonium whose prospect for consumption is uncertain.

The stalemate of the fast-breeder reactor project clearly throws the whole nuclear fuel cycle policy in doubt. But while Monju has been idled for years, policymakers have been unwilling to review the policy. Even the previous Democratic Party of Japan-led administration said it will maintain the program when it called for a phaseout of nuclear power generation by the end of 2030s.

The policymakers fear that declaring an end to the nuclear fuel cycle program could put the nuclear power generation itself in paralysis. About 3,000 tons of spent nuclear fuel from reactors around Japan have been shipped to the storage facility in the Rokkasho complex for future reprocessing.
Aomori Prefecture accepted the spent fuel on promises by the national government and the power industry that the prefecture will not be the final disposal site for nuclear waste.

A 1998 agreement between the parties require the power companies to "swiftly take necessary and appropriate steps" including the transfer of spent fuel out of the Rokkasho complex if the reprocessing program becomes difficult, raising the prospect of massive stockpiles of spent fuel without storage space.

But what the government and the power industry should do is end the policy to push the nuclear fuel cycle project — whose key components are clearly in doubt — and concentrate on finding solutions to these and other problems that could emerge from the ending of the policy, rather than rely on skewed

rhetoric aimed at justifying pursuit of the program on the grounds that it will lead to solutions to the related problems.

Keeping the long-dormant Monju project alive without a serious review — along with the pursuit of the much-doubted nuclear fuel cycle program — will only add to people's distrust of the government policy on nuclear energy. The government is urged to think twice about its decision.

March 4, 2014

French collaboration

2014 Japan eyes joint research on Monju with France

http://www3.nhk.or.jp/nhkworld/english/news/20140305_01.html

Japanese government officials plan to work with their French counterparts in developing next-generation nuclear reactor technologies to reduce radioactive waste.

They are apparently aiming to use the nation's troubled Monju fast-breeder reactor.

Engineers in France are developing the ASTRID prototype reactor, which is expected to begin operation around 2025. Both reactors are designed to reduce nuclear waste.

Sources say Japanese officials are preparing to reach a basic agreement with France in late April. This will be followed by a formal accord.

The Monju reactor is located in Tsuruga City, central Japan. Its operation has repeatedly been suspended because of a sodium coolant leak and other problems.

The nation's nuclear regulators have effectively banned the resumption of its operations after the revelation that more than 10,000 safety checks were not carried out.

But the government leaders made clear in their new basic energy plan last month that they will continue the project.

They say they will thoroughly review the project and achieve results by cooperating with international researchers.

However, a number of lawmakers, including members of the ruling camp, are calling for the Monju reactor to be scrapped.

March 10, 2014

Rokkasho - Plutonium: An "irresistible target for terrorists"?

Source : Huffington Post

A World Awash In A Nuclear Explosive?

http://www.huffingtonpost.com/2014/03/10/nuclear-explosive_n_4934451.html?utm_hp_ref=world

Center for Public Integrity | by Douglas Birch and R. Jeffrey Smith

By Douglas Birch and R. Jeffrey Smith

WASHINGTON — A generation after Three Mile Island and Chernobyl, the world is rediscovering the attractions of nuclear power to curb the warming pollution of carbon fuels. And so a new industry focused on plutonium-based nuclear fuel has begun to take shape in the far reaches of Asia, with ambitions to spread elsewhere — and some frightening implications, if **Thomas Cochran** is correct.

A Washington-based physicist and nuclear contrarian, Cochran helped kill a vast plutonium-based nuclear industrial complex back in the 1970s, and now he's at it again — lecturing at symposia, standing up at official meetings, and confronting nuclear industry representatives with warnings about how commercializing plutonium will put the public at enormous risk.

Where the story ends isn't clear. But the stakes are large.

The impetus for Cochran's urgent new campaign — supported by a growing cadre of arms control and proliferation experts — is a seemingly puzzling **decision by Japan to ready a new $22 billion plutonium production plant for operation as early as October.**

The plant will provide fuel for scores of special reactors resembling those canceled in America a generation ago. Critics of the Japanese project worry that its completion in just a few months will create a crucial beachhead for longtime nuclear advocates who claim that plutonium, a sparkplug of nuclear weapons, can provide a promising civilian path to carbon-free energy.

According to its builders, the Rokkasho Nuclear Fuel Reprocessing Facility, which has been undergoing testing since 2006, will be capable of churning out 96 tons of plutonium metal in the next dozen years, an amount greater than all the stocks that remain in the United States as a legacy of the Cold War's nuclear arms race. **Rokkasho would be the fifth-largest such facility in the world, but the only one in a country without nuclear weapons.**

The metal is to be burned by Japanese utilities in dozens of fast breeder reactors, so named because they have the capability to both consume and produce plutonium. The ambition is to make Japan, a craggy, energy-starved island, nearly self-sufficient in generating electrical power.

But there is a hitch, Cochran and his allies say. A big one.

A lump of plutonium weighing 6.6 pounds — roughly the size of a grapefruit — is enough to make a nuclear weapon with an explosive power of 1 kiloton, or 1,000 tons, of TNT. If the Japanese plan goes forward, the island nation in theory would in a year have plutonium sufficient to build around 2,600 bombs, or enough to compose the world's third-largest nuclear arsenal.

Japan has renounced any desire to make nuclear weapons, but Cochran and others worry that by creating a huge plutonium stockpile — and shuttling it all over the country — the utilities there will be creating a tempting, perhaps irresistible, target for nuclear terrorists.

And though Japan is perhaps closest to finishing such a massive plutonium factory, its ambitions are far from unique.

Iran is building a research reactor near the western city of Arak capable of producing enough spent fuel to make about 20 pounds of high-grade plutonium a year — the equivalent of nearly three bombs a year. Tehran says nothing in the Nuclear Non-Proliferation Treaty prevents it from acquiring peaceful nuclear technology, but its plans have provoked widespread Western condemnation and are the focus of continuing international negotiations.

India recently completed a reprocessing plant capable of extracting new plutonium from about 100 tons of spent fuel yearly at Tarapur, north of Mumbai, in 2011. It joined three older plants that produced 3.8 to 4.6 metric tons of plutonium over the past 40 years.

Little is known about another plutonium plant under construction at Kalpakkam, south of Chennai on the Indian Ocean, but the Nuclear Threat Initiative, a Washington-based nonprofit group, says it "will likely surpass" Tarapur "as India's largest plutonium producer."

China is considering building a new civilian plutonium plant about the size of Rokkashoat the site of two decommissioned military plutonium plants at the Jiuquan Complex in Gansu Province. Even so, a spokeswoman for the Chinese Foreign Ministry said on Feb. 21 that the government had "grave concerns over Japan's storage of weapon's grade plutonium, and lodged representations to the Japanese side recently."

South Korea has expressed a similar interest in plutonium production, pointing explicitly to Japan as a precedent. And Japan itself has embarked on campaign — in India and elsewhere — to market its nuclear proficiency and technology.

"You're talking about spreading this technology [and scientific expertise] all over the world in non-weapons states, and trying to safeguard it, " says Cochran. "It's a recipe for weapons capability."

So far, Japan's pursuit of its ambitious plutonium program — using nuclear fuel and technology provided partly by the United States — has mostly been greeted by public silence among government officials in allied capitals.

But there is little dispute the consequences could be far-reaching. Standing by while Japan opens the Rokkasho plutonium factory could "make it impossible" for the U.S. to resist pressure from other

countries seeking bomb-fuel technology, said Thomas Moore, who served for ten years as a senior Senate Foreign Relations Committee expert on arms control.

Henry Sokolski, a former Defense Department official who now runs the Nonproliferation Policy Education Center in Washington, says that if Rokkasho opens, the United States will find it particularly hard to tell South Korea that it cannot make plutonium-based fuels — a goal that Seoul is strenuously lobbying for in Washington, as part of a bilateral nuclear trade agreement. Saudi Arabia, Egypt, Algeria, and Indonesia, could also follow Japan's example, Sokolski said. Others worry about Turkey, Vietnam or Egypt. The list goes on and on.

"It's very hard," says James Acton, a nuclear policy expert at the Carnegie Endowment for International Peace in Washington, "to divide the world into states we like and states we don't like, and say to one group it can do whatever it wants and say to members of the other group that they have to restrain their behavior."

Already, the world has accumulated approximately 490 metric tons of plutonium, enough for about 81,600 nuclear weapons similar to the bomb dropped on Nagasaki, in the 73 years since specks of plutonium were first synthesized at the University of California, Berkeley.

Japan, still reeling from the nuclear reactor disaster at Fukushima three years ago this week, is proceeding with the Rokkasho plant, its atomic energy officials say, because abandoning it would kill jobs, bankrupt utilities, and undermine plans to reopen up to 50 of the nuclear reactors forced to shutter by Fukushima. Without Rokkasho to process their waste, the reactor sites would soon be overflowing with spent fuel.

But there's more to it than that. Japan — like the United States before 1976, England from 1959 to 1994, and France from 1967 to 2009 — has long dreamed that the radioactive wastes created by nuclear reactors could one day be routinely "recycled" or burned as fuel to make electricity instead of being buried underground.

After spending tens of billions of dollars and decades on breeder-related programs, Tom Cochran said, countries find it hard to pull the plug.

"You have an entrenched bureaucracy and an entrenched research and development community and commercial interests invested in breeder technology, and these guys don't go away," Cochran said. "They're believers … and they're not going to give up. The really true believers don't give up."

A big-box store for terrorists?

At 72, Tom Cochran's shock of hair has mostly gone gray, but he still has an impish face, like an older, worldlier Huckleberry Finn; he's now a consultant to his longtime employer, the nonprofit Natural Resources Defense Council, but shows no sign of slowing down.

Richard Garwin, another famously impolitic physicist who played a key role in the building of the hydrogen bomb, describes him as “a sterling character” in “a fairly small community of people who have worked very hard to keep fissile materials from getting loose.”

When Cochran is told something he doesn’t believe, he breaks into a sideways kind of smile. When he hears something he disagrees with, he often launches into a concise and reasoned rebuttal in a gentle Tennessee drawl, but it can sometimes turn bruising. Colleagues call him a bold, original thinker whose debating talents far outstrip his diplomatic skills.

He “absolutely has no reticence, no reticence at all about anything he says,” says noted Princeton physicist — and Cochran ally — Frank Von Hippel. Cochran once admitted to Von Hippel in a moment of candor, Von Hippel said, that “I’ve discovered that I enjoy attacking my friends as much as my enemies.”

Cochran, a Navy veteran and Vanderbilt University-trained physicist, whose father sold General Electric generating equipment to utility companies after serving on the staff of Gen. George C. Marshall during World War II, became a thorn in the side of the U.S. nuclear industry in the early 1970s. That was when a Washington environmental research group, Resources for the Future, hired him to write a book on the consequences of expanding nuclear power.

He got sidetracked after stopping at the government’s Oak Ridge National Laboratory during his honeymoon in 1971 to learn about the Nixon Administration’s Clinch River breeder reactor project. “If you were a nuclear engineer, and particularly in the very early period, you were excited,” he said. Atomic Energy Commission engineers figured they were “designing the Ferrari of the nuclear power industry,” capable of squeezing more energy from an atom than all its forebears.

“They just had this little problem,” Cochran said. “Plutonium.”

While researching his book, Cochran read Nuclear Theft: Risks and Safeguards, a landmark study that still sits on a shelf of his compact, glass-walled office at NRDC’s Washington headquarters. Published in 1974, one year after Cochran moved to the NRDC, the book detailed the terrorist threat posed by the production and trade in plutonium and highly-enriched uranium. It was co-written by the physicist Theodore Taylor, a former Los Alamos nuclear weapons scientist who designed some of the most powerful and compact warheads in the nuclear arsenal, including one fitted to a Jeep-carried, tripod-mounted bazooka, called “the Davy Crockett.”

That same year, *New Yorker* writer John McPhee published a book about Taylor — *The Curve of Binding Energy* — in which the physicist detailed how shockingly easy it would be for terrorists to obtain the raw materials for a nuclear bomb.

So Cochran sought Taylor out, and the older physicist become something of a role model and mentor. Cochran’s own book, *The Liquid Metal Fast Breeder Reactor*, published that same year, laid out the

technical and financial case against plutonium, and argued that the Atomic Energy Commission had underestimated the long-term costs of developing, building and operating plutonium-fueled reactors.

It marked the beginning of an eight-year, unsuccessful NRDC campaign to deny a Nuclear Regulatory Commission license to the Clinch River Breeder Reactor, which was being built by a consortium of 753 utility companies and industrial giants like Westinghouse and General Electric. Cochran and other critics won only after the nuclear accident at Three Mile Island chilled the public's interest in such projects and when federal budget officials determined the reactors' high costs made them bad investments.

Over the course of the long struggle, Cochran frequently debated breeder advocates, among them Milton Shaw, a protégé of naval reactor guru Adm. Hyman Rickover who directed the AEC's reactor research and development. In one meeting at Shaw's office, Shaw pointed at a trunk and told Cochran, "See that box there? I'm going to bury you in that box."

Shaw died in 2001, but Cochran has fought on for four decades, testifying before Congress, lecturing at universities, and appearing at debates nationwide. He often begins speeches by noting that it only takes a few pounds of plutonium to make a weapon; that the instructions for building a crude bomb are publicly available; and that the only thing standing between a determined terrorist and an improvised atomic explosive device is access to the bomb's fuel.

Once a terror group acquires a modest amount of plutonium that could fit in an 8-ounce Coke can, Cochran said, it could easily move it across borders, despite hundreds of millions of dollars the United States has spent — or misspent — since 9/11 to build a global network of sensors and surveillance to detect it. The bomb itself, he says, could be built almost anywhere. And the most likely source of the critical ingredient, the plutonium or highly-enriched uranium, would be a large-scale production or storage facility — a facility like Rokkasho.

All but one of these big facilities are currently in states that already have nuclear weapons — states like Russia, France and the United Kingdom, which are accustomed to guarding nuclear explosive materials. Japan would be the only exception.

"Stealing a weapon is too hard," Cochran said. "But there is no big risk in fuel assemblies, or in taking things from a bulk handling facility that can be used to make weapons." In this view, Rokkasho is a kind of big-box store for would-be nuclear terrorists.

To be sure, some experts scoff at this scenario. "Reprocessing has been done safely and securely," said Everett Redmond II, director of nonproliferation at the Nuclear Energy Institute, a Washington-based trade group. "The French do it. The British did it. The Japanese I'm sure will do it."

But Cochran believes massive facilities like Rokkasho are difficult to secure against malevolent insiders and armed attackers, no matter where they are located, how closely production is tracked or how many gates, guards and guns are deployed. The theft of small amounts of plutonium over months or years from any facility that processes thousands of tons of spent fuel annually is difficult to detect,

he says. Stopping a stealth campaign by a high-ranking plant official to systematically siphon off materials could be impossible, he says.

Moreover, he contends, because of the sheer volume of international trade and shortcomings in sensor technology, nuclear explosives could not be readily detected in crossing international borders. So those stolen anywhere could theoretically wind up in a bomb in Detroit, Denver or New York.

More stories in the Nuclear Waste investigation from the Center for Public Integrity.

Just a few pounds worth of plutonium?

There's been a ghoulish debate between officials and independent scientists about how much plutonium is needed to fuel a clandestine bomb. But both agree it's not much.

The U.S. bomb that destroyed half of Nagasaki in 1945 had 6.2 kilograms of plutonium in it, or 13.6 pounds. But experts say it was over-engineered — only one kilogram fissioned, they concluded later.

The International Atomic Energy Agency nonetheless decided years ago that eight kilograms of plutonium, or 17.6 pounds, are needed to make a bomb and so that's the quantity its monitoring is geared to stop from getting loose.
Cochran and his NRDC colleague Christopher Paine challenged the IAEA standard in 1995 with a study concluding that only 3 kilograms — 6.6 pounds — would be needed to fashion a "very respectable" bomb with the explosive power of a kiloton, or 1,000 tons of TNT. But no matter who is right, Rokkasho's annual plutonium production would be enough for 1,000 weapons or more.

To build an efficient plutonium bomb, the plutonium would have to be shaped into a sphere so it could be compressed with conventional explosives and rapidly reach critical mass, Cochran said. If the plutonium is crammed together too slowly, it becomes, according to an old weapons-designer joke, "fizzle" material instead of fissile material. It detonates prematurely, and only a tiny fraction is fissioned.

But a skilled, well-financed team could take a thermos-full, Cochran says, shape it into a hollow sphere about the size of a baseball or softball, pack it inside a sphere of explosives in a way that focuses the blast inward and turn it into a weapon that could produce a nuclear blast of one or two kilotons, equal to 1,000 or 2,000 tons of TNT.

"The technology needed to make a plutonium bomb is very old," Cochran says. "This is not rocket science. So it's within the capability of a team of people who had some sophistication."

He paused. "This is why people worry about plutonium."

A one-kiloton device exploded at ground level in a heavily populated area would be comparable in its effects to the Nagasaki bomb that exploded more than 1,500 feet in the sky, causing about 75,000 deaths and a similar number of injuries. A 2003 study by Harvard's Matthew Bunn, a former White House adviser now at Harvard's Kennedy School of Government, pegged the direct cost of damage from a 10-kiloton bomb at $1 trillion, along with incalculable political, economic, and social chaos.

The danger that plutonium harvested from the spent fuel of civilian reactors could be used to build nuclear weapons was dramatized in 1974. India used a reactor built by Canada under the U.S. Atoms for Peace program to produce plutonium that fueled the first nuclear explosive detonated by a country other than the five permanent members of the United Nations Security Council.

The bomb was built from plutonium produced by India's CIRUS — for "Canadian-Indian Reactor, U.S." — at the Trombay nuclear complex north of the city now called Mumbai. CIRUS is a type of reactor that uses heavy water as a moderator and can run on natural rather than enriched uranium. The research reactor being built by Iran at Arak is also a heavy-water design.

Presidents Gerald Ford and Jimmy Carter reacted by trying to discourage the development of civilian plutonium programs at home and abroad. Carter tried to stop Japan's by withholding permission to use U.S.-supplied materials and technology for the effort. But Japan insisted on proceeding, and the White House settled for an agreement under which Japan would seek permission for each new batch it made.

Then, in 1982, President Reagan issued a secret National Security Decision Directive giving Japan "advance consent" to produce plutonium and trade it with European allies, as long as it met certain guidelines. And in 1987, Reagan went further, publicly granting Japan blanket approval essentially to make all the plutonium it wished, as part of a broader nuclear trade agreement. The groundwork for Rokkasho had thus been laid.

The Coke can experiment

In the abstract, there's plenty of alarm in official circles. "Just one nuclear weapon exploded in a city — be it New York or Moscow; Tokyo or Beijing; London or Paris — could kill hundreds of thousands of people," President Barack Obama told the United Nations Security Council in September 2009. "And it would badly destabilize our security, our economies, and our very way of life."

But Cochran has long criticized the effectiveness of one of Washington's most costly and elaborate strategies to prevent such a catastrophe — a global effort to detect and capture illicit fissile materials at border crossings and major world ports.

Since 2003 the United States has spent more than $850 million on equipment and training for customs officials at 45 foreign ports so they can scan shipping containers to detect nuclear materials. It's a daunting assignment. About 432 million shipping containers crisscrossed the oceans in 2009 alone. U.S. ports accept 15 million containers every year.

The initial goal of the Energy Department's National Nuclear Security Administration under the so-called Megaports program was to install equipment at more than 100 foreign ports by 2018 and train local officials to scan half of global traffic. But many countries with large stocks of nuclear explosive materials did not participate in the program, according to the NNSA, including France, India, Russia and Japan.

Some countries that installed the U.S. equipment — like Panama — later reported using it on a tiny fraction of their cargo. As of 2012, China had installed just a single monitor at one port, out of 12 Chinese ports given high priority rankings by Washington, according to a report that year by the Government Accountability Office.

The NNSA has never released data on what nuclear materials its foreign partners reported seizing, but intelligence officials have said the equipment has only flagged tons of mildly radioactive scrap metal, not the makings of potential bombs.

"The technologies used … may not be able to detect nuclear or other radiological material that has been shielded or masked, and terrorists could also bypass" it, the GAO report stated. It added that the Energy Department, which inherited some of the scanners as cast-offs from the Department of Homeland Security, didn't adequately test them; instead, it changed the name of the hardware to "avoid the negative connotations associated with" its prior service.

At a Washington symposium last year meant to showcase some new technologies for portal monitoring, Cochran stood in the audience, cautioned the sponsor that they might want to turn off their video recorders, and then firmly tore apart the premise that such detection devices could play a useful role in protecting the country from nuclear terror.

"I wouldn't put another penny" in such technologies, Cochran said, because "it won't reduce the risk." The billions already spent could better have been used for "intelligence, police work, locking up materials at the source," or eliminating their production altogether. Millions of illegal immigrants "didn't go through ports," he said. And screening all rail cars and container ships would be impossibly costly.

Cochran says that border detection is a particularly futile exercise for enriched uranium. Radiation detectors would have to be placed on top of a container, he says, to register the kind of radiation given off by uranium. Plutonium is more difficult to shield, but it could still be done — perhaps by packing the plutonium in a light material, like a plastic containing many hydrogen atoms to absorb the neutrons that would set off a detector.

"The only way you can solve this problem is by securing the plutonium at the source," or by not producing it in the first place, he said. "You can't secure the border."

Battered by persistently critical audits and by criticisms like Cochran's, the Energy Department has slowly been shifting ground. In budget documents last year, DOE suspended installation of new scanning equipment at large container seaports pending a review on the cost and effectiveness of the program. The administration's budget called for eliminating the $133 million program in fiscal 2014. Congress in January also capped spending on the Megaports program, providing enough funds to expand it only modestly.

While Cochran couches many of his arguments in the language of mathematics and physics, he has also sought to drive home his points with theatrics.

At the height of the 1970s battle over the Clinch River Breeder Reactor, he hit on an idea for demonstrating how easy it would be to smuggle the fuel needed for an atomic bomb past international borders.

So for $100, he purchased by mail from a Massachusetts lab supply company a 6.8 kilogram — 15 pound — cylinder of dense, heavy, depleted uranium, a mildly radioactive waste material from reactors that cannot be used to make a bomb. Fifteen pounds was the largest order allowed without a government license; the same quantity can still be purchased readily today. The cylinder had the same weight and a similar bulk as the plutonium used in the Nagasaki bomb.

Then, when he flew to lectures or meetings, Cochran wrapped the uranium in lead, stuck it in a length of yellow-painted pipe with a handle welded to it and carried it through airport security. After being stopped at an x-ray machine in one airport, he told the operator "it's uranium, don't worry about it. It's okay." She let him through and he carried it onto the plane.

On arrival at lecture halls, he would push his stand-in for plutonium into an empty Coke can he had sawn in half. During his talks, he would hold the can up so his audience could see it, and say the contents could incinerate a city. "A six-pack of these is a nuclear arsenal," he would say.

During a 1995 Senate Foreign Relations subcommittee hearing in the Capitol building about how easy it would be to smuggle plutonium out of Russia, Cochran produced his Coke can and waved a hand-held radiation detector over it to prove it was radioactive.

Six years later, after the 9/11 attacks, ABC News correspondent Brian Ross asked Cochran to borrow his Coke can, and wound up smuggling it from Vienna back to the United States, first by boarding a train through the Balkans and then by container ship out of Istanbul. The ship docked at a Staten Island facility where Customs officials said they had installed detectors capable of spotting radioactive materials.

"This is what they're looking for or should be looking for and this is what they absolutely have to stop," Cochran said on camera. But Customs inspectors never opened the ornamental Turkish chest the can was stored in, and it was later carried by truck to a warehouse at the foot of the Brooklyn Bridge, across from Manhattan.

U.S. Customs Commissioner Robert Bonner told ABC that inspectors determined "that container did not pose a threat for having, let's say, some sort of nuclear weapons grade material in it or a nuclear device."

But Cochran said Customs could not have detected anything without opening the crate, and obviously missed it. "You can reliably detect most anything with sufficient money or time to do it, but you don't have sufficient money or time to do it at a border," he says. "So basically you can't reliably detect it."

After a second smuggling episode embarrassed the Department of Homeland Security in 2003, the department dispatched agents to the ABC News offices in Los Angeles, the home of a cameraman, and Cochran's home in Alexandria, Va., where they blocked him from leaving to shop for groceries.

"Has any law been broken?" Cochran asked. An agent said she wanted to ask him some questions. Cochran said he would, but only in his office during the work week, and only with an NRDC lawyer present. The meeting never occurred and no charges were ever filed. But Homeland Security officials seized the depleted uranium.

Asked about the episode several months ago, Gillian M. Christensen, a spokesman for the Department of Homeland Security's Immigration and Customs Enforcement service, said she could not find any information about the investigation or the fate of the sample.

So ended the tale of the nuclear Coke can — at least for now. Cochran isn't making any promises about the future. "I think it's a more dangerous time [than] when Ted Taylor was making his case, and I began to make that case," Cochran says. "It was difficult to point to active terrorist cells that were out there, poised to get this kind of material. And now we know they're out there."

Annoying? Perhaps. Persistent? For sure. But the way Cochran sees it, sometimes that's what it takes.

This story was published ***by*** The Center for Public Integrity***, a nonprofit, nonpartisan investigative news organization in Washington, D.C.***

March 30, 2014

About the stocks of plutonium

Reducing plutonium stockpiles

http://www.japantimes.co.jp/opinion/2014/03/30/editorials/reducing-plutonium-stockpiles/#.UzmKplfi91s

The agreement reached last week by nations at the Nuclear Security Summit to minimize their stockpiles of plutonium gives more reason for Japan to review its nuclear fuel cycle program, under which it plans to reprocess spent fuel from nuclear power reactors to extract plutonium for reuse — despite uncertainties over how its already large stock of separated plutonium would be consumed.

In a bid to reduce the amount of nuclear materials that can be exploited for terrorism purposes, world leaders gathering at the summit held March 24-25 in The Hague, the Netherlands, agreed in their joint statement that protective measures in storing weapons-grade plutonium and highly enriched uranium should be updated. The communique also urged the states to cut the stockpiles of both nuclear materials to the minimum level "as consistent with national requirements."

Japan is the only non-nuclear weapons country to have a program to reprocess spent nuclear fuel on an industrial scale. To dispel nuclear proliferation fears, the government has pledged that it will not possess plutonium whose use has not been decided.

But the prospect for using Japan's stock of plutonium is now unclear. While Japan's decision to return to the U.S. about 300 kg of weapons-grade plutonium that had been provided for research purpose during the Cold War era was hailed as one of the achievements at the The Hague summit, the nation has 44 tons of separated plutonium from past reprocessing of spent nuclear fuel either at home or overseas.

Under the government's nuclear fuel cycle program, the extracted plutonium is to be used in plutonium-uranium mixed-oxide (MOX) fuel for consumption at fast-breeder reactors and other types of reactors. But the nation's sole prototype fast-breeder reactor Monju in Tsuruga, Fukui Prefecture, has been kept offline for much of the past two decades after it first reached criticality in 1994 and the prospect for the fast-breeder reactor's commercial operation appears dim.

Utilities started using MOX fuel at some of their light-water reactors after years of delay but they have all been shut down following the March 2011 meltdowns at Tokyo Electric Power Co.'s Fukushima No.1 nuclear power plant. The Abe administration plans to restart some of the idled reactors once they have been given safety clearances by the Nuclear Regulation Authority under tightened guidelines. But the government's plan before the 2011 crisis to consume the separated plutonium as MOX fuel at 16 to 18 reactors across the country seems unfeasible now.

Meanwhile the launch of a nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture, has been delayed for years due to a series of technical problems. The government is pushing for the plant's launch as a key component of the nuclear fuel cycle policy. But extraction of more plutonium at the reprocessing plant would only add to the stockpiles whose prospect for use is uncertain.

In the summit, Prime Minister Shinzo Abe stressed that Japan's plutonium stockpiles have been safely guarded and that its use for exclusively civilian purposes has been confirmed by the International Atomic Energy Agency.

Still the Abe administration and power companies should take the agreement at the Nuclear Security Summit seriously and come up with feasible plans for steadily reducing the nation's plutonium stockpiles. One option would be to give up the nuclear fuel cycle program that entails the reprocessing of spent fuel.

April 11, 2014

Monju - Cheating again

More missed inspections found at Monju reactor

http://www3.nhk.or.jp/nhkworld/english/news/20140411_41.html

Japanese nuclear regulators are investigating more cases of missed inspections at the Monju fast-breeder prototype reactor. It's located in Fukui Prefecture on the Sea of Japan Coast.

The Nuclear Regulation Authority, or NRA, found the lapses during regular safety checks in March.

Officials say at least 9 out of 80 targeted items had not been inspected. These include a temperature gauge and a switch for equipment that powers the secondary cooling pump.

NRA officials also say workers had revised inspection records without taking the required step of informing an in-house panel on more than 240 occasions.

The NRA last year found around 14,000 missed inspections at Monju, including those for critical safety equipment.

Last May, the authority ordered the operator, the Japan Atomic Energy Agency, not to prepare for a restart of the reactor until its safety can be established.

In September, the operator reported that it had completed all inspections.

The prototype nuclear reactor has been mostly offline since a coolant leak accident in 1995 and a fuel exchange device was mistakenly dropped into the reactor in 2010.
Apr. 11, 2014 - Updated 11:17 UTC

See also:

Inspection report falsification suspected at Monju fast-breeder

http://mainichi.jp/english/english/newsselect/news/20140411p2g00m0dm036000c.html

TSURUGA, Japan (Kyodo) -- The operator of the Monju prototype fast-breeder reactor in Fukui Prefecture is suspected of falsifying its inspection report to regulators as they later found new pieces of equipment that had not been inspected there, Nuclear Regulation Authority sources said Thursday. […]

April 13, 2014

US worries about Japan's plutonium stockpile

U.S. alarmed about plutonium stockpile growing from Rokkasho plant

http://ajw.asahi.com/article/behind_news/politics/AJ201404130029

By TOSHIHIRO OKUYAMA/ Senior Staff Writer

The U.S. government has expressed "grave concern" to Japanese officials over Tokyo's spent nuclear fuel reprocessing program as it increases Japan's stockpile of plutonium and the risk of proliferation, according to a joint investigation by The Asahi Shimbun and the Center for Public Integrity, a U.S. nonprofit journalism organization.

With the nation's 48 nuclear reactors offline, the planned start-up of a plant in Rokkasho, Aomori Prefecture, which will extract plutonium from spent nuclear fuel, will only increase Japan's already-growing stockpile of plutonium, U.S. nuclear policy experts said.

If the plant starts operations as early as this year, it would pose serious concerns about the Obama administration's efforts to control nuclear proliferation, they said.

In April last year, Daniel Poneman, U.S. deputy secretary of energy, told Tatsujiro Suzuki, then vice chairman of the Japan Atomic Energy Commission, during Suzuki's visit to the United States that he was deeply concerned that Japan would have more stocks of separated plutonium from the reprocessing of spent nuclear fuel while there is no plan for consumption.

The remark surprised Japanese officials because Poneman, known as a pro-nuclear expert, was believed to be sympathetic with Japan's reprocessing program.

Japan Nuclear Fuel Ltd., the operator of the Rokkasho facility, plans to complete construction of the plant by October. The maximum reprocessing capacity will be 800 tons of spent nuclear fuel per year, recovering up to 8 tons of plutonium.

Japan already has a stockpile of 44 tons of plutonium, which can make up several thousand nuclear weapons.

During a recent interview, Jon Wolfsthal, who served as a nuclear nonproliferation expert at the U.S. National Security Council between 2009 and 2012, expressed disappointment over Japan's failure to make changes to its reprocessing program even after the Fukushima nuclear disaster.

"I'm disappointed that Japan and everything they've gone through in the last three years hasn't fundamentally re-evaluated their need for this material," Wolfsthal said. "I think it would be better, personally, if Japan did not have a MOX (mixed oxide fuel) program and operate Rokkasho."

Wolfsthal added that there was a general sense in the Obama administration that Japan would not listen to U.S. advice on the matter and that harping on it would only deteriorate bilateral relations.

At a symposium in Tokyo in December, Robert Einhorn, who had been special adviser for nonproliferation and arms control at the U.S. State Department, questioned the moves by Japan and France to proceed with nuclear fuel reprocessing.

"Why did all (other) advanced countries take the decision to abandon reprocessing?" Einhorn asked. "Is there something different about Japan and France, which led these countries in a different direction?"

In a speech in Tokyo in October, U.S. Energy Secretary Ernest Moniz also said, "The United States continues to believe the separation of plutonium needs to be in balance with a corresponding pathway for the eventual consumption or disposition of that material."

Meanwhile, the Abe Cabinet approved on April 11 the nation's new basic energy plan, which regards nuclear power as a key electricity source and will restart idled nuclear reactors if their safety is confirmed. The plan also pointed to pushing forward the reprocessing program and the completion of the Rokkasho plant as a pending policy goal.

But it also tries to address Washington's concern by including a clause that says, "We do pay due consideration to the balance between supply and demand of plutonium."

PROLIFERATION RISKS

For Japan to reprocess spent nuclear fuel requires the consent of the U.S. government based on a Japan-U.S. nuclear cooperation agreement, but Washington is concerned of the negative effects that Japan's large plutonium stockpile can have on negotiations with South Korea and Iran over their nuclear programs.

During Suzuki's U.S. visit in April, Thomas Countryman, assistant secretary of state for international security and nonproliferation, also expressed "grave concern" over the Rokkasho plant from the standpoint of its ramifications on U.S.-South Korea nuclear cooperation and Iran's nuclear program.

Washington was undergoing difficult negotiations with Seoul, which demanded the United States give consent to its program to extract plutonium and other nuclear materials from spent fuel. The U.S. concern was that if it had granted such approval, it would have encouraged Saudi Arabia, Jordan, Vietnam and other countries to demand their right to extract plutonium.

Complicating matters is the sentiment on the South Korean side that it is unfair that Japan has been given consent to extract plutonium but South Korea, which is also Washington's close ally, has not been granted the same right.

Also, Iran and North Korea can claim it is a Washington double standard to allow Japan to produce plutonium, while demanding they give up their nuclear programs.

During a lecture in South Korea in October, Einhorn said he recognizes Seoul's "desire for parity with Japan" on nuclear reprocessing.

In an apparent attempt to assuage South Koreans, Einhorn said, "Japanese experience with both reprocessing and enrichment--the spending of many billions of dollars over several decades for programs that have provided little if any commercial value--is not one South Korea should want to emulate."

(Douglas Birch, senior reporter for The Center for Public Integrity, contributed to this article.)

April 16, 2014

Monju reactor: A modern-day alchemist's dream?

Nuclear fuel cycle in need of alchemy amid waste disposal problems

http://mainichi.jp/english/english/newsselect/news/20140416p2a00m0na011000c.html

"The life span of radioactive matter could be shortened from around 10,000 years to a few hundred!"
"The final disposal site (of radioactive materials) could be reduced to one-one hundredth of its planned size."

The above quotations were included within documents outlining the technology for dramatically shortening the longevity of nuclear power's residual waste, which were handed out by Akito Arima, 83 -- former minister of education and University of Tokyo president -- during an April 3 closed-door meeting among some 20 Liberal Democratic Party (LDP) lawmakers who support nuclear power.

The Monju fast-breeder reactor, which has served as the core of the nation's nuclear fuel cycle, reuses plutonium as fuel after it has been extracted from spent nuclear fuel. Because this would produce more plutonium than was consumed, it was heralded as a "dream nuclear reactor." A sodium leak, however, as well as a series of additional accidents and scandals, have meant that the actual operation of the reactor remains nowhere in sight.

"There is no such thing as impossibility when it comes to Japanese technology," emphasized Arima -- an authority in the field of nuclear physics -- during the meeting.

"Even though it may have leaked sodium, there is no problem with the (Monju) nuclear reactor," he added, prompting a lawmaker to comment, "This is the theoretical backing that we need (in order to continue with the Monju reactor)."

The following day, April 4, the LDP approved a draft of the government's Basic Energy Plan. The document outlined goals in the area of research and development for new technologies aimed at reducing nuclear waste in a bid to prolong the life of the Monju fast breeder reactor.

Despite the fact that technology aimed at short-lived radioactive substances has already been studied for more than a quarter of a century, however, there is still no prospect for its practical use. In fact, it seems possible to compare this effort with the dubious practice during the Middle Ages of trying to turn lead and other substances into gold -- rendering the present-day project, in other words, as a sort of "modern-day alchemy."

The present-day phenomenon in question is that of the OMEGA Program, which was begun by the Japanese government in 1988 to separate radioactive substances found inside nuclear waste -- such as neptunium-237, whose half-life is 2.14 million years -- and transform them into different radioactive materials with a shorter life span.

While this effort, if realized, would have been useful for processing spent nuclear fuel, it saw almost no success. One top official from the Ministry of Education, Culture, Sports, Science and Technology in effect wrote the project off, saying that it was "defunct."

An executive with the Japan Atomic Energy Agency, which operates the Monju reactor, admitted the project's limitations by commenting, "Not even the technology for separating long-lived radioactive materials from spent nuclear fuel has been established. To dispose of all presently-existing spent nuclear fuel would require around 10 (nuclear reactors capable of short life span conversions)."

"It is premature to mention (the Monju reactor) within the Basic Energy Plan," points out Tatsujiro Suzuki, former vice chairman of the Japan Atomic Energy Commission. "Any discussions regarding a 'dream project' should be separated from the reality of nuclear waste."

With no prospects existing for Monju's operation, around 44 tons of plutonium capable of being diverted toward nuclear weapons continues to accumulate in the meantime both inside and outside of Japan's borders. Last month, the Japanese government announced that it would be returning 330 kilograms of the plutonium to the United States -- a figure representing less than 1 percent of the total amount.

Additionally, if the nuclear fuel reprocessing facility in Aomori Prefecture -- which is presently seeking activation -- does end up going into full-scale operation, an additional eight tons of plutonium will be created a year. The only likelihood for its usage would be the pluthermal (plutonium-generated)

project utilizing mixed oxide fuel (MOX), which is made from both plutonium and uranium. Only seven nuclear reactors among the total of 17 reactors at 10 nuclear plants waiting for government permission to restart are expected to utilize the pluthermal energy program, however, which would mean that any plutonium created at the reprocessing facility would not be able to be completely utilized even at full operation.

The Oma Nuclear Power Plant, which is presently being constructed by the Electric Power Development Co., Ltd. (J-POWER) in Aomori Prefecture, is a "full-MOX reactor" that would be the first in the country that could be powered solely by MOX fuel. The city of Hakodate in Hokkaido, however -- located within 30 kilometers from the site -- has filed a lawsuit to stop its construction.
The Shizuoka Prefectural Government has expressed opposition to pluthermal plans at the Hamaoka Nuclear Power Plant operated by the Chubu Electric Power Co. in the prefecture -- indicating that conditions in this regard are unfavorable overall.

The United States is, moreover, becoming increasingly cautious regarding the matter -- with U.S. Deputy Secretary of Energy Daniel Poneman commenting that the possibility of plutonium increasing without a clear plan for its usage is an issue of serious concern.

With the dream now gone of nuclear fuel being increased via fast-breeder reactors, the nuclear fuel cycle seems to be casting about for an alchemical process that would reduce the amount of nuclear waste.

The government is embarking on a restart of idled nuclear reactors with an Achilles' tendon -- effectively calling to mind the act of building an apartment building without bothering to install a toilet.

April 29, 2014

Japan-France: Joint research on ASTRID

Fast reactor research set with France

http://the-japan-news.com/news/article/0001243370

The Yomiuri Shimbun Japan and France will formally agree to promote joint research on a fast reactor, the next-generation nuclear reactor, during Prime Minister Shinzo Abe’s visit to France, The Yomiuri Shimbun has learned
.
According to sources, Japan will provide technical cooperation to France’s fast reactor development project, the main purpose of which is to reduce high-level radioactive waste.

As part of the joint research, France will call on Japan to use its Monju facility, a prototype fast-breeder reactor in Fukui Prefecture, to test fuel for ASTRID (Advanced Sodium Technological Reactor for Industrial Demonstration), France's new fast demonstration reactor. As operations at Monju have been suspended following a series of difficulties, the Japanese government will prepare to restart its operations.

A consensus document for the joint research will be signed by representatives from the Education, Culture, Sports, Science and Technology Ministry, the Natural Resources and Energy Agency and France's Alternative Energies and Atomic Energy Commission. At a summit meeting between Abe and French President Francois Hollande, which is scheduled for May 5, the two leaders are expected to reconfirm the document.

On Tuesday, Abe took a government plane from Haneda Airport for his European tour, which will take him to six countries—Germany, Britain, Portugal, Spain, France and Belgium.

France aims to complete a basic design for the ASTRID reactor by 2019 and start its operations around 2025. The new fast reactor is aimed at reducing the amount of radioactive waste produced at nuclear power plants, as well as drastically shortening the period during which radioactivity generated from nuclear waste is hazardous to humans.

The Japanese government apparently intends to show its proactive attitude toward the issue of how radioactive waste should be handled through the Japan-French joint research, with an eye to reactivate nuclear power plants in the country. Currently, all the nation's 48 nuclear reactors for power generation have been suspended.

According to the sources, the French contingent has made strong demands to use Japan's Monju reactor to test fuel for the ASTRID reactor. To facilitate this, the Japanese government will accelerate organizational reforms of the Japan Atomic Energy Agency (JAEA), which is responsible for operations at Monju, and seek to reactivate Monju by having it pass safety checks by the Nuclear Regulation Authority and other requirements.

After the joint research project is officially agreed upon, the JAEA, Mitsubishi Heavy Industries, Ltd., French nuclear group Areva and others will conduct joint research together on a design outline for the ASTRID reactor this summer at the earliest, and start work on its basic design from around 2016, the sources said.

Concerning cooperation on a fast reactor between Japan and France, Abe and Hollande agreed to enhance their partnership, which was stipulated in a joint statement released after their summit meeting in June last year.

A fast reactor is a nuclear reactor where fast neutrons released through the fission events of radioactive fuel are used without moderating their speed, so that these fission events will continue. Through this approach, the reactor is capable of generating more fuel than it consumes while generating electricity, and can also be used to reduce the volume of radioactive waste.

May 11, 2014

Contradictions evident in Govt's nuclear fuel-cycle policy

A new look at spent nuclear fuel

http://www.japantimes.co.jp/opinion/2014/05/11/editorials/a-new-look-at-spent-nuclear-fuel/#.U29eKSji91s

Recent statements by Shizuoka Gov. Heita Kawakatsu concerning the stalled plan to use plutonium-uranium mixed-oxide (MOX) fuel at Chubu Electric Power Co.'s Hamaoka nuclear power plant in Omaezaki, Shizuoka Prefecture, highlight various contradictions in the central government's continuing pursuit of a nuclear fuel-cycle policy.

In an interview with Kyodo News and at a subsequent news conference in April, the governor said his prefecture's approval of the utility's plan to use MOX fuel at the Hamaoka No. 4 reactor — given before nuclear power safety was thrown into doubt by the March 2011 meltdowns at Tokyo Electric Power Co.'s Fukushima No. 1 plant — should be considered invalid.

Kawakatsu is suggesting that Chubu Electric will need to obtain the consent of the prefecture and host municipalities all over again if it plans to push ahead with using the plutonium-uranium fuel at Hamaoka.

Kawakatsu also urged Chubu Electric to shift from the practice of storing spent nuclear fuel in water pools at the power plant to the alternative "dry cask storage."

He went on to say that the Hamaoka plant would be able to store spent fuel in dry casks on-site even if the used fuel currently kept at a reprocessing plant in Rokkasho, Aomori Prefecture, is returned to the plan in the event the reprocessing program goes nowhere.

For decades, the central government has pursued a policy of recycling fuel used at nuclear power plants by reprocessing it into MOX fuel, to be used again both at fast-breeder reactors — which are designed to produce more plutonium than they consume — and at light-water reactors. It was meant to be a dream program for resource-scarce Japan.

However, Monju, the nation's sole prototype fast-breeder reactor in Tsuruga, Fukui Prefecture, has been inoperative for nearly two decades now because of a series of accidents and problems with its operator.

Use of MOX fuel began at several light-water reactors at nuclear power plants around the country, but all of them are offline today, and the tightened safety requirements on restarting nuclear power plants following the Fukushima disasters raise doubts about whether the prospect of having 16 to 18

reactors nationwide consume the nation's plutonium stockpiles — already reaching 44 tons — is realistic.

Completion of the Rokkasho reprocessing plant has been delayed for years due to a raft of technical glitches, but starting the plant's operation could end up producing more separated plutonium whose consumption is uncertain.

Nevertheless, the nation's Basic Energy Plan, adopted by the Abe administration last month, keeps up the quest for a nuclear fuel-cycle policy — even though doubts about the validity of the program have become widespread because of the realities surrounding it.

One logic that proponents use in pushing the policy, despite all the doubts, is that a halt to the reprocessing plan could put the nation's nuclear power generation itself in jeopardy. Spent fuel from nuclear power plants around the country that has been shipped to Rokkasho, waiting to be reprocessed, will need to be returned to each plant if the reprocessing program is canceled. This will lead eventually to the filling to capacity of spent nuclear fuel pools at the plants, effectively making it impossible for the utilities to operate their nuclear reactors.

This problem could be resolved if, as Kawakatsu says, the nuclear power plant operators kept their spent nuclear fuel — including fuel that might be returned from Rokkasho — on the premises of their plants in dry cask storage.

With this method, spent fuel already cooled in the pool for at least one year would be surrounded by inert gas inside a container called a cask — typically steel cylinders that provide leak-tight confinement of spent fuel — and further surrounded by additional materials including steel and concrete for radiation shielding.

While dry cask storage is becoming more common at American and European nuclear power plants, it has so far been used at only a few Japanese plants. The method is believed to be technically more stable than storage in pools, where temperatures can rise if the cooling system fails because of the loss of water or power.

Spent fuel today occupies about 70 percent of the total storage pool capacity at the nation's nuclear power plants and the Rokkasho facility combined, raising alarms that the capacity would be used up within years if power plants are restarted without the reprocessing of used fuel at the Rokkasho plant.

Kawakatsu said that typical nuclear power plant sites should have enough surplus space for dry cask storage of spent fuel, noting that at least the Hamaoka plant does.

Dry cask storage does not provide a permanent solution to the problem of what to do with spent nuclear fuel. Still, it could provide some leeway for reviewing the government's rigid pursuit of the nuclear fuel cycle policy.

The Hamaoka plant has five reactors, including two aging ones that Chubu Electric decided in 2008 to decommission. In 2011, the utility shut down two operating reactors and held off restarting another that was down for maintenance at the urging of the government following the Fukushima meltdowns.

In February, Chubu Electric applied to the Nuclear Regulation Authority for safety screening of its plan to restart the No. 4 reactor, hoping to resume operations upon the completion of the extra anti-earthquake and tsunami measures by the end of September 2015.

Kawakatsu said he would seek to hold a plebiscite to get local residents's views if the government and the utility decide to restart the Hamaoka plant. His retraction of Shizuoka's go-ahead for the MOX fuel use at the plant may also influence other prefectures and municipalities that had had MOX plans approved for the nuclear power plants they host — before the Fukushima nuclear crisis.

The governor's remark that it is rational for nuclear waste to be kept where it has been produced speaks volumes about another problem with nuclear power generation in Japan — the imbalance between the direct beneficiaries of nuclear power and those who bear the biggest burdens of it.

Tokyo, for example, is the nation's largest consumer of electricity, but nuclear power plants that serve its needs are built hundreds of kilometers away. Shizuoka, however, happens to be both a producer and consumer of nuclear power.

The government has been unable for years to find candidate sites for the final storage of high-level radioactive waste from power generation. The lack of clear answers to this question is symbolic of the shaky nature of nuclear power in Japan.

May 26, 2014

Cost of returned (reprocessed) waste tripled since 1995

Japans spends 17 billion yen for nuclear waste; price per unit triples

http://ajw.asahi.com/article/business/AJ201405260041

By SATOSHI OTANI/ Staff Writer

Japan paid 16.938 billion yen ($166 million) for high-level radioactive waste generated during reprocessing in Britain for the government's trouble-plagued nuclear fuel-recycling program, a customs declaration report showed.

The cost was a record 128 million yen for each of the 132 vitrified nuclear waste containers that arrived at the Rokkasho reprocessing plant in Aomori Prefecture in April. That was triple the price when reprocessed nuclear waste was first returned to Japan in 1995.

The increasing cost is believed to stem partly from tighter security on management and transportation to protect the nuclear waste from terrorists and other forces.

The added financial burden is expected to be passed on to consumers in their electricity bills.

Under the government's recycling program, spent nuclear fuel originating at domestic nuclear power plants is sent to overseas companies for reprocessing. The procedure extracts plutonium and processes it with uranium into mixed oxide (MOX) fuel. The MOX fuel is then returned to Japan for use in nuclear power generation.

In addition, high-level radioactive waste is generated in the process and sent to Japan.
The soaring costs and questions about safety and other issues have prompted calls to scrap the recycling program. Japan Nuclear Fuel Ltd.'s Rokkasho plant, which is expected to reprocess spent nuclear fuel on its own, has also faced numerous problems.

Still, Prime Minister Shinzo Abe's Cabinet included promotion of the nation's nuclear fuel-recycling program in its new basic energy plan approved in April.

Japan has commissioned the reprocessing to facilities in Britain and France since 1969.

The imported MOX fuel has been transferred to domestic nuclear plants, and some of it was used before all nuclear reactors in Japan went offline following the Fukushima nuclear disaster in 2011.

The containers of vitrified nuclear waste, each 40 centimeters in diameter, 1.3 meters tall and weighing 490 kilograms, have been sent to Rokkasho since 1995.

The containers must be buried deep underground for permanent storage, but the government has not determined disposal sites, leaving them accumulating in the compound of the Rokkasho plant.

The 132 containers that arrived in Japan in April represented the 16th batch that Japan has imported.

However, regional utilities, which set up Japan Nuclear Fuel and technically own the nuclear waste that originated from their own plants, have refused to disclose the cost for overseas reprocessing. They say the price is based on a "contract between private corporations."

A report to the Hachinohe branch of the Hakodate Customs office showed the cost has risen to 128 million yen per container from 122 million for the previous import in February 2012 and 44 million yen in April 1995.

A series of accidents at the British reprocessing facility is also believed to have contributed to the higher reprocessing cost. About 640 vitrified nuclear waste containers remain in Britain. They are expected to be transferred to Japan by 2019.

September 16, 201

Fuel recycling?

Panel starts discussion on nuclear fuel recycling

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

An expert panel of Japan's economy and industry ministry is studying whether the government should provide financial support for nuclear fuel recycling.

The panel began their discussions on Tuesday. Its members say they can't decide what kind of role nuclear power should play in the nation's energy policy until they have a clear idea about how to operate costly fuel recycling.

Some say power companies are shouldering the cost of fuel recycling at present, but the government needs to be involved because the electricity market is undergoing liberalization.

Others express doubt about government involvement, saying the public will have to pay for the cost.

The panel aims to issue an interim report on the position of nuclear power in Japan's energy policy, including possible government support for nuclear fuel recycling by the end of the year.

The mid- and long-term energy plan adopted in April defines nuclear power as an important base-load power source for stable energy supplies.

The government hopes to reprocess all spent fuel to extract plutonium and reuse it at nuclear plants.

Fuel recycling is expensive but it can reduce the volume of nuclear waste.

September 17, 2014

Plutonium stockpile almost 3 kg heavier than in 2012

Japan’s plutonium stockpile jumped to 47 tons in 2013

http://www.japantimes.co.jp/news/2014/09/17/national/japans-plutonium-stockpile-rose-47-tons-2013/#.VBmatRanq1s

Kyodo
Newly added were 2.3 tons generated through spent fuel reprocessing outsourced to Britain and 640 kg not reported to the global watchdog in 2012 and 2013. The 640 kg is part of mixed plutonium-uranium oxide (MOX) fuel stored in a reactor that was offline during that time.

Revelations of the unreported 640 kg stoked controversy in June, though the Japan Atomic Energy Commission had said it was exempt from International Atomic Energy Agency reporting requirements, insisting at that time that fuel inside reactors is considered "being used."
Under Japan's nuclear fuel recycling policy, plutonium extracted by reprocessing conventional uranium fuel is consumed by existing reactors in the form of MOX fuel. But this policy is jeopardized by public concerns about nuclear power amid the Fukushima crisis.
A further increase in plutonium could raise concerns in the international community about its possible diversion to nuclear weapons.
The earlier unreported 640 kg of plutonium was contained in MOX fuel loaded in March 2011 into reactor 3 of Kyushu Electric Power Co.'s Genkai nuclear plant in Saga Prefecture during its regular checkup, but has been left there unused as the reactor could not restart in light of the disaster at Tokyo Electric Power Co.'s Fukushima No. 1 complex.

September 18, 2014

47 tons plutonium

Japan's plutonium stockpile expands to 47 tons

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201409180052

Japan's plutonium stockpile increased by 2.9 tons over one year to 47.1 tons at the end of 2013, and the country has no current operation in place to reduce what has become an international concern.
The Cabinet Office submitted a report to the Japan Atomic Energy Commission about the amount of plutonium possessed by Japan both domestically and abroad.
Half of the increase came from reprocessing work of spent nuclear fuel commissioned in Britain.
With no reprocessing facilities operating in Japan, domestically-produced plutonium levels remained flat.
However, the domestic plutonium stockpile increased by 1.5 tons to 10.8 tons, including 0.9 tons of mixed-oxide (MOX) fuel that was returned to Japan in June 2013. That fuel, which contains uranium and plutonium extracted from spent nuclear fuel produced in Japan, was manufactured in France after reprocessing.
The removal of unused MOX fuel in March 2013 from a reactor at Kyushu Electric Power Co.'s Genkai nuclear power plant in Saga Prefecture added 640 kilograms to the domestic stockpile.
Unused nuclear fuel kept in nuclear reactors is not included in the plutonium statistics because it is considered "in use." The removal of the fuel from the reactor led to its addition to the stockpile.
Japan had planned to burn MOX fuel at its nuclear power plants, but they are all currently shut down in light of tougher safety standards set after the 2011 Fukushima nuclear disaster.
The growing amount of plutonium has raised concerns in the United States that the stockpile could become the target of terrorist attacks or used to produce nuclear weapons.
Japan and eight other nations submit reports to the International Atomic Energy Agency about the amount of plutonium possessed domestically for civilian purposes.
Britain possessed the largest amount at the end of 2012, with 120 tons.

September 19, 2014

What about the nuclear fuel recycling program?

EDITORIAL: Time running out to scrap nuclear fuel recycling program

http://ajw.asahi.com/article/views/editorial/AJ201409190028

Japan currently stores spent nuclear fuel primarily at 18 nuclear power plants around the country. Most of the 17,000 tons of radioactive material is kept in spent nuclear fuel pools.

Storage of spent nuclear fuel in pools is highly vulnerable to incidents such as natural disasters and terrorist attacks. If such an incident were to occur, the spent fuel rods in pools could cause immense damage by releasing huge amounts of radiation. This problem was brought to the fore by the disaster at the Fukushima No. 1 nuclear power plant in 2011.

But the debate on storage and disposal of spent nuclear fuel is getting nowhere fast.

A nuclear power subcommittee of the Ministry of Economy, Trade and Industry's Advisory Committee for Natural Resources and Energy held a meeting Sept. 16 to discuss a range of topics, including spent nuclear fuel. But nothing notable came out of the discussions. Why?

The principal factor is the **government's refusal to change its policy of continuing the nuclear fuel recycling program.**

The program is designed to reuse all spent nuclear fuel in fast-breeder reactors or in existing reactors. If the system for recycling nuclear fuel is actually realized, the problem of having to store spent fuel in the pools would be solved.

But **it is already clear that neither the** Monju project to develop practical fast-breeder reactors nor the "pluthermal" project to use nuclear fuel made from reprocessed plutonium and uranium in existing reactors is viable, technologically or economically.

Following the 2011 nuclear disaster, the Cabinet Office's Japan Atomic Energy Commission said that direct disposal of spent nuclear fuel would be cheaper than reprocessing, after estimating the costs of both approaches.

The Science Council of Japan and other expert organizations pointed out that storing spent nuclear fuel in dry casks--typically leak-tight steel cylinders containing an inert gas--placed on the ground for a limited period of time is an effective way to avoid the risks of storage in pools.

Pursuing alternative storage methods requires the government to start reconsidering its nuclear fuel recycling program.

The government will also have to rethink its relations with Aomori Prefecture, which has accepted fuel reprocessing facilities. But there will be no realistic solution to the dangers of storing spent nuclear fuel in the pools unless the government takes the step.

Currently, used fuel is treated as "assets" for accounting purposes. **But if it is regarded as waste, it has to be reported as "debt" on the balance sheets of the operators of the nuclear power plants.**

As a first step toward a policy shift, the government should publish objective data about the nuclear fuel recycling program, including information about accounting practices and other issues.

If idled nuclear reactors are restarted while the program remains unchanged, **spent fuel pools at nuclear power plants will start reaching their capacity in three years, according to an estimate by the industry ministry.**

In addition, **the power retail market will be fully liberalized in 2016, with the scrapping of the government-regulation system for electricity rates.**

The pluthermal project, which is financially supported by the electric utilities that operate nuclear power plants, is bound to become a burden on that market liberalization.

The government is running out of time to make the major policy decision to pull the plug on the nuclear fuel recycling program.

September 20, 2014

Rokkasho's completion postponed

Completion of nuclear fuel plant to be delayed

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The operator of a spent nuclear fuel reprocessing plant in northeastern Japan is expected to postpone completion of the plant by about 18 months due to the ongoing government screening.

NHK learned that Japan Nuclear Fuel Limited is making final adjustments to a plan to delay completion from October to early 2016.

The plant in Rokkasho, Aomori Prefecture, has been undergoing screening by the Nuclear Regulation Authority since January. Regulators are trying to determine whether the facility meets new requirements for nuclear plants introduced after the 2011 disaster in Fukushima.

But regulators say they have not been able to conduct screening. They say documents submitted by the operator are insufficient.

It is not known when the screening will finish.

If the schedule is revised, this will be the 22nd postponement of the plant's completion.

The Japanese government decided in its basic energy plan in April to promote nuclear fuel recycling.

But a delay in the completion of the reprocessing plant could adversely affect the government's policy.

Japan Nuclear Fuel is expected to formally decide next month when the plant will be completed. It will then submit its decision to the Nuclear Regulation Authority after reporting to local governments.

September 29, 2014

Tokai reprocessing plant to be shut

Tokai reprocessing plant to be scrapped

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The Japan Atomic Energy Agency says it will scrap its Tokai nuclear fuel reprocessing plant north of Tokyo by April 2017 at earliest.

The decision to close the facility, announced on Monday, comes after stricter regulatory standards established following the 2011 Fukushima nuclear disaster.

The cost of revamping the Tokai plant to meet the new standards has been estimated at over 900 million dollars, masking it too expensive to maintain.

The plant extracts uranium and plutonium from spent nuclear fuel. It has processed about 1,140 tons of spent fuel since operations began in 1977.

Authorities say the transfer of the plant's functions to a reprocessing plant in Rokkasho Village, Aomori Prefecture, is almost complete.

The Tokai facility was expected to treat spent fuel from the Monju fast-breeder reactor in Fukui Prefecture, so its closure may negatively impact the government's policy to reuse spent nuclear fuel.

Tokai reprocessing plant to shut

http://www.world-nuclear-news.org/WR-Tokai-reprocessing-plant-to-shut-2909144.html

The Japan Atomic Energy Agency (JAEA) will shut its reprocessing plant in Tokai, reportedly due to the costs of modifications required under post-Fukushima safety regulations.

Following a meeting today of JAEA's reform commission, the agency announced that it will permanently shut down the Tokai facility in Ibaraki prefecture.

The Tokai plant is Japan's oldest reprocessing plant. Construction of the plant began in 1971, with trial operation starting in 1977. The plant entered full operation in 1981 but has stood idle since 2006 when a contract for reprocessing used fuel from commercial power reactors came to an end. The plant was mainly used for processing mixed-oxide (MOX) fuel from the Fugen experimental Advanced Thermal Reactor (ATR), which ceased operating in 2003.

The plant has reprocessed a total of some 1052 tonnes of used fuel comprising 88 tonnes of fuel from the Fugen ATR, 644 tonnes of boiling water reactor fuel, 376 tonnes of pressurized water reactor fuel and 9 tonnes of fuel from the Japan Power Demonstration Reactor (JPDR).

A JAEA spokesman told the Kyodo news agency that it had decided to shut the plant as it would cost too much to upgrade it to meet new safety rules. He said more than Y100 billion ($915 million) would be required to upgrade equipment and enhance safety for the Tokai plant to continue operating.

New safety rules for Japanese fuel cycle facilities came into force in late 2013. The requirements vary from facility to facility, but generally include reinforcement measures against natural threats such as earthquakes and tsunamis, and in some cases tornadoes, volcanoes and forest fires. At fuel fabrication plants, proper confinement of radioactive material is required, as are severe accident countermeasures for potential criticality accidents. Reprocessing plants need to demonstrate these as well as countermeasures specifically for terrorist attacks, hydrogen explosions, fires resulting from solvent leaks and vaporization of liquid waste.

JAEA said that the first part of the reprocessing process at Tokai, where used fuel is made into solution, will be shut soon. However, the second part, where these solutions are treated, will continue operating for about the next 20 years in order to treat used fuel solution currently stored at the facility.

Some 110 tonnes of unprocessed used fuel is also at the plant. The JAEA spokesman said that this fuel is likely to be sent overseas for reprocessing.

Researched and written
by World Nuclear News

September 30, 2014

Not worried about proliferation

U.S. nuclear concerns sidelined by plutonium plans

http://www.japantimes.co.jp/news/2014/09/30/national/u-s-nuclear-concerns-sidelined-plutonium-plans/#.VCruLBanp1s

Bloomberg
VIENNA – U.S. concern over the long-term proliferation risk of nuclear waste isn't stopping countries from planning to extract plutonium from radioactive refuse to power a new generation of atomic reactors.
French, Japanese, Russian and South Korean officials lined up against their U.S. counterparts in September at the International Atomic Energy Agency, where two weeks of meetings on waste, proliferation and energy ended Monday in Vienna.
"We've made it pretty clear that we are not interested or supportive," U.S. Secretary of Energy Ernest Moniz said last week at a briefing.
Countries that do move forward with plans to reprocess nuclear waste into new reactor fuel should make sure to keep plutonium inventories at a minimum, he said.
About 8 kg of plutonium are needed to make a nuclear weapon and it's technically impossible to account for all the material in the biggest reprocessing facilities. With about 50 metric tons of stockpiled weapons-grade plutonium, the U.S. decided in the 1970s not to separate more of the heavy metal for civilian purposes. Other countries are pressing toward a vision that would keep nuclear waste as an asset rather than a liability by stripping it of plutonium.
By reprocessing plutonium "we reduce the amount of waste for disposal and we reduce the footprint of the repository," Gerald Ouzounian, international director at France's Radioactive Waste Management Agency, said Sept. 23 at an IAEA panel.
Russia is nearing a decision to begin selling a new generation of reactors that will run on mixed-oxide, or MOX, fuel using plutonium, Rosatom's director of innovation, Vyacheslav Pershukov, told the IAEA.
Plutonium processing is also "in the pipeline" for South Korea, the country's minister of science, Yanghee Choi, said last week.
Japanese plans to start a $21 billion reprocessing plant stoked tensions with China in March after it emerged that more than 9 tons of plutonium were stockpiled without any use after the country's reactors were shut down following the March 2011 tsunami that wrecked the Fukushima No. 1 nuclear plant.
"A major concern" for the U.S. is that plutonium is piling up in Japan without being used to fuel reactors, Moniz said. "Clearly in Japan, until a significant number of nuclear reactors — if and when — are restarted, there will be no end use of the MOX."
It will be difficult for Japan Nuclear Fuel Ltd. to start its reprocessing plant in Rokkasho, Aomori Prefecture, as planned in October because it is still under regulatory review, spokesman Yoshi Sasaki said Sept. 24. The company has not decided on a revised start date, he said.
The long-term viability of creating a market for plutonium requires the commercialization of new reactors, said U.S. Nuclear Regulatory Commission Chairman Allison MacFarlane. Only Russia's BN-800 sodium-cooled fast reactor is close to commercialization.
The U.S., which stopped developing fast reactor technologies in the 1990s, prefers direct disposal of nuclear waste rather than reprocessing.
"You do have a proliferation issue with the kind of reprocessing that is practiced by France and some other countries," MacFarlane said at the IAEA. "By directly disposing you don't develop that large proliferation hazard."

October 29, 2014

Monju playing up again

New safety breaches at prototype Monju reactor

http://www3.nhk.or.jp/nhkworld/english/news/20141029_27.html

Japan's Nuclear Regulation Authority says the operator of the prototype fast breeder reactor Monju violated safety regulations by failing to repair dozens of surveillance cameras.

The facility in Tsuruga, central Japan, has been idle since a sodium leak accident in 1995. Liquid sodium was used to cool the experimental reactor.

In May last year, the NRA ordered the operator, the Japan Atomic Energy Agency, to halt preparations for resuming a test run after about 14,000 pieces of equipment were found to have gone uninspected.

Then last month, 54 of the plant's 180 surveillance cameras set up after the accident were found to have gone unfixed for up to 18 months.

On Wednesday, the regulator criticized the operator for lacking willingness to reform itself.

NRA Chairman Shunichi Tanaka questioned the agency's stance on safety. He said the authority will continue checking whether conditions at Monju have improved.

October 30, 2014

Rokkasho: More delay to be expected

Completion of spent nuclear fuel plant delayed

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

A Japanese nuclear fuel company has decided to postpone the completion of a facility for reprocessing spent nuclear fuel to March 2016 due to ongoing rigorous government screening.

It is the 22nd time work has been delayed at the facility in the village of Rokkasho in Aomori Prefecture, northeastern Japan. The problem-prone plant has yet to go into operation after more than 20 years of construction work.

The president of Japan Nuclear Fuel Limited, Kenji Kudo, informed Aomori Prefecture Vice Governor Ikuo Sasaki of the latest decision to postpone completion on Thursday.

The Nuclear Regulation Authority has been assessing whether the Rokkasho plant meets new standards since January. The more stringent requirements were put in place following the March 2011 nuclear disaster at Fukushima Daiichi. It is not clear how long the screening will take.

Reprocessing spent nuclear fuel from power plants is part of the Japanese government's basic energy policy. Plutonium extracted in this process is to be used as fuel at power plants.

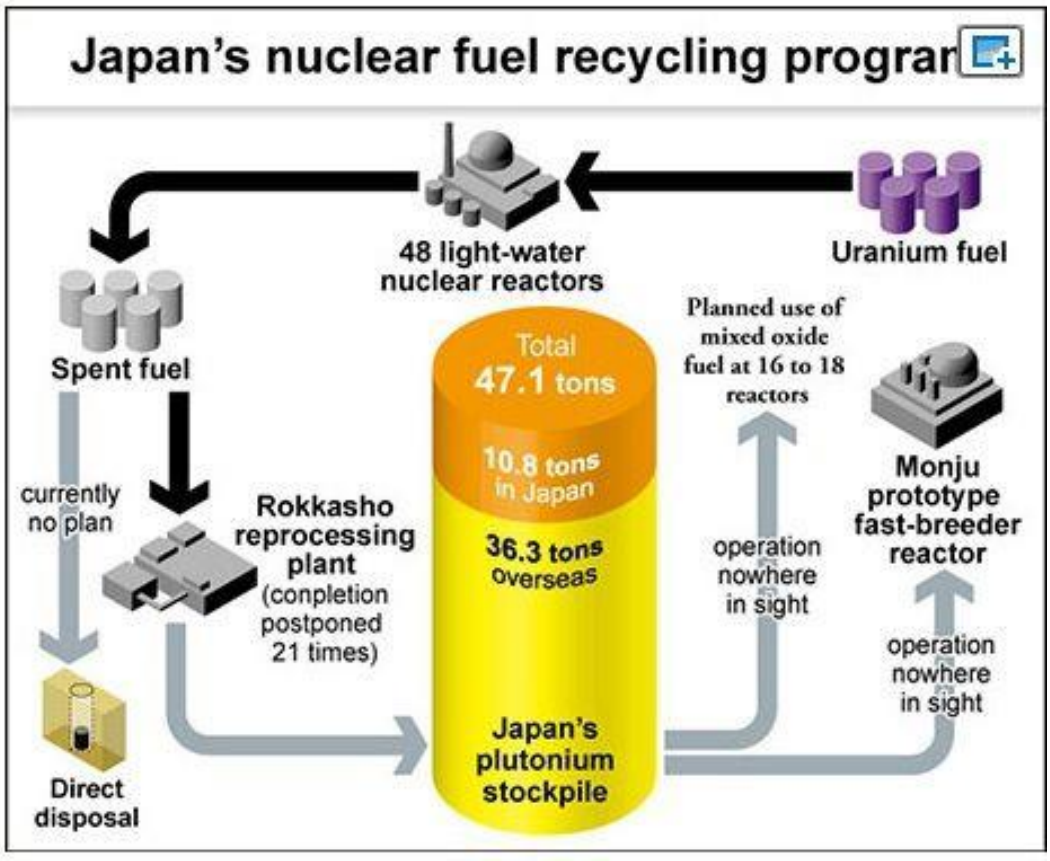
But a delay in the completion of the reprocessing plant in Rokkasho is a setback for the government's strategy to recycle nuclear fuel.

November 3, 2014

Pluthermal postponed for the 21st time

Industry group to postpone 'pluthermal' program again

http://ajw.asahi.com/article/behind_news/social_affairs/AJ201411030039



By TOMOYOSHI OTSU/ Staff Writer

An electric power industry organization will postpone the wide-scale start of the "pluthermal" program, a pillar of the government's nuclear fuel recycling project that has long been wracked by setbacks.

The Federation of Electric Power Companies of Japan (FEPC) had planned to use the program, which reuses plutonium from spent fuel, at 16 to 18 nuclear reactors in Japan by fiscal 2015.

However, the completion of two key facilities in the recycling project has been delayed, and prospects for restarting idled nuclear reactors remain dim.

The FEPC will decide on a new deadline after viewing situation surrounding possible restarts of the reactors.

Under the pluthermal program, spent nuclear fuel is reprocessed to remove plutonium and uranium, which are then used to manufacture "mixed oxide" (MOX) fuel. The MOX fuel is then used at light-water reactors.
One goal of the pluthermal program is to help reduce Japan's huge stockpile of plutonium.
However, the deadline for the completion of a domestic plant to manufacture MOX fuel was postponed to October 2017.
And on Oct. 30, Japan Nuclear Fuel Ltd. pushed back the completion date of its Rokkasho reprocessing plant in Aomori Prefecture to March 2016. The Rokkasho plant, which will reprocess spent fuel under the recycling program, must pass stricter safety inspections for construction work to continue.
It was the 21st postponement for completion of the Rokkasho facility.
The multiple postponements, glitches, safety issues and enormous costs have raised doubts about the feasibility--and necessity--of the fuel recycling program.
After the government explained the project, the FEPC in 1997 announced plans to use the pluthermal program at 16 to 18 reactors of 11 companies, including nine major electric utilities, "by fiscal 2010."
In 2009, however, the FEPC postponed the deadline to "by fiscal 2015."
Before the March 2011 nuclear accident at the Fukushima No. 1 nuclear plant, the pluthermal program was used at four reactors, including the Fukushima plant's No. 3 reactor and the Takahama nuclear power plant's No. 3 reactor.
The reprocessing of spent nuclear fuel and manufacturing of MOX fuel have been conducted at overseas plants.
After the Fukushima disaster, however, operations of all nuclear reactors in Japan were suspended.
For the utilities to restart their idled reactors, they must pass tougher safety standards of the Nuclear Regulation Authority.
Although the FEPC is expected to maintain 16 to 18 as the number of reactors subject to the pluthermal program, the government plans to decrease the nation's dependence on nuclear power generation, meaning the figure will likely decrease.
In addition, some reactors may be difficult to restart, including the Tsuruga nuclear power plant's No. 2 reactor, where an active fault was found running below its building, according to the NRA.
Demand is growing in the industry for the government to offer support to electric power companies that are expected to use the pluthermal program.
They argue that the financial burden of each utility will increase if the number of reactors that would use MOX fuel is reduced.

The motive to continue the recycling program has been lost

ANALYSIS: Abe bereft of reasons to continue nuclear recycling program

http://ajw.asahi.com/article/behind_news/social_affairs/AJ201411030052

By TOSHIO KAWADA/ Staff Writer
The main components of the government's nuclear fuel recycling project have all been sidelined. But the program was already in a state of collapse even before the March 2011 Fukushima nuclear disaster led to a shift in Japan's energy policy.
After the meltdowns at the Fukushima No. 1 nuclear plant, the Democratic Party of Japan-led government considered reviewing the recycling program. However, the current Liberal Democratic Party-led government of Prime Minister Shinzo Abe has clearly said in its basic energy plan that it will maintain the recycling program.

Abe is now stuck with a recycling project that shows no signs of functioning properly. Completion of a facility that will create mixed-oxide (MOX) fuel consisting of plutonium and uranium has been postponed.
Problems have continued at the Monju prototype fast-breeder reactor. And for the 21st time, work has been delayed on building a facility that will reprocess spent nuclear fuel.
The Abe government's policies on nuclear power generation are based on the assumption that the recycling program will be maintained. If the government decides to scrap the rickety program, it could be forced to abolish nuclear power plants.
In 1998, Japan Nuclear Fuel Ltd. (JNFL), which was set up by major electric power companies and is currently constructing the spent nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture, concluded a memorandum with the Aomori prefectural government and the Rokkasho village government.
Under the memorandum, if it becomes difficult to implement the reprocessing program, JNFL must remove the spent nuclear fuel that has accumulated at the still-incomplete reprocessing plant.
The logical places to transfer that spent nuclear fuel are the nuclear plants where the fuel was originally used. But spent fuel storage pools at these plants are already nearing capacity, and the plants could be forced to shut down to avoid creating additional nuclear waste.
Even if all nuclear power plants are abolished, Japan would still own more than 47 tons of plutonium. If the plutonium stockpile cannot be reduced through the recycling program, Japan could find itself in violation of an international accord on the possession of surplus plutonium.
Some countries could view Japan as a country aiming to use the plutonium for military purposes.
A Japan-U.S. nuclear power agreement that allows Japan to reprocess spent nuclear fuel as an exceptional case is scheduled for review in 2018. The agreement is based on the assumption that plutonium removed through reprocessing would again be used in nuclear power generation. If the prospects for the use of plutonium remain unclear, the bilateral negotiations on the agreement could be affected.
The nuclear fuel recycling program's construction and maintenance costs will continue to increase. Following the liberalization of retail sales of electricity in Japan, it is becoming clearer that the recycling program will bring only a higher financial burden on electric power companies.
The motive for continuing the recycling program has been lost.

November 14, 2014

Build new plants or/and extend life of older reactors?

Nuclear operators push to open new plant, extend life of aging reactors

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201411140068

Across Japan, utilities are backing the Abe administration's support of nuclear power generation by continuing construction of a new facility and seeking to extend the life of reactors that have been operating for about 40 years.
Electric Power Development Co. (J-Power) announced Nov. 13 that it will apply to the Nuclear Regulation Authority for safety screenings to start operations at its Oma nuclear power plant, which is currently under construction.
The announcement came at a town assembly meeting at Oma, Aomori Prefecture, where J-Power President Masayoshi Kitamura said the company will submit the application by the end of the year and plans to have the new facility fully operational in fiscal 2021.
If everything proceeds as scheduled, the Oma plant will be the first instance in which power companies applied for the start of operations at new reactors that are still under construction.

While the No. 1 reactor at Tokyo Electric Power Co.'s Higashidori plant in Aomori Prefecture and Chugoku Electric Power Co.'s Shimane plant No. 3 reactor in Matsue are also currently under construction, the utilities have not submitted applications to start the reactors.
Although the central government's basic energy plan states that dependency on nuclear power should be reduced as much as possible, it does not clearly mention the construction of new nuclear facilities.
The government does not deem nuclear plants as "new or additional" if their construction started before the March 2011 Great East Japan Earthquake, which set off the nuclear disaster at the Fukushima No. 1 power plant.
Forty percent of the construction of the Oma plant had been completed prior to the disaster.
However, there is no guarantee that the screening process will proceed smoothly because the structure and operation procedures of the Oma facility are different from those of conventional nuclear plants.
The Oma plant will be the world's first 100 percent MOX nuclear facility, where only mixed-oxide (MOX) fuel, consisting of plutonium and uranium, is used at reactor cores for the purpose of consuming plutonium produced in processing spent nuclear fuel.
At conventional plutonium-thermal nuclear plants, MOX fuel is used at just one-fourth to one-third of their reactor cores at most, and conventional uranium fuel is used for the remaining part.
Compared with uranium fuel, it is more difficult for control rods to suppress nuclear chain reactions of MOX fuel.
Although countermeasures, such as enhancing the capabilities of control rods and introducing larger tanks for boric acid water to better control atomic reactions, will be taken at the full MOX facility, those efforts are expected to be carefully examined during the safety screening by the NRA to check if they are sufficient.
"**No full MOX facility has so far gone online around the world,"** NRA Chairman Shunichi Tanaka said at a Nov. 12 news conference. "We will examine extremely carefully (if countermeasures are sufficient)."
Meanwhile, J-Power said Nov. 13 that it will also take the necessary steps to meet the stricter safety standards introduced after the Fukushima nuclear crisis.
The company said it will raise its projected earthquake preparedness scale from the current 450 gals to 650 gals. Measured with seismographs, a gal is a unit of acceleration that measures the extent of an earthquake's seismic waves. Earthquakes with high levels of magnitude also have high gal measurements.
J-Power will also have to set up the required second control room to counter possible terrorist attacks, such as ones utilizing airplanes.
J-Power estimates that the costs needed to introduce additional safety measures to comply with the new regulations will total 130 billion yen ($1.12 billion).

PROLONGING LIFE OF AGED REACTORS
Elsewhere, with the Abe administration supporting the restarts of the nation's idle reactors after they pass NRA safety screenings, Kansai Electric Power Co. is making efforts to prolong the operating lives of aged reactors.
The government set the acceptable operational term of nuclear reactors at 40 years, in principle, after the Fukushima disaster, but it allows utilities to extend the period on a one-time basis by a maximum of 20 years.
Kansai Electric is currently considering applying for prolonging the operation of the No. 1 and 2 reactors of its Takahama plant in Fukui Prefecture. The two reactors began service in 1974 and 1975, respectively.
Seven reactors nationwide that will be more than 40 years old by July 2016 need to submit applications by July 2015 if the plant operators hope to extend their operational periods.
Kansai Electric is expected to apply to the government for the extension as early as next spring.

“From the beginning, we have been upgrading our facilities on the assumption that we will use the reactors for more than 60 years,” said a senior Kansai Electric official. “We hope to continue to use them if we will be able to solve safety and cost issues.”

Old nuclear power plants can recoup almost all of the costs needed to build them during their prolonged time of operations. Therefore, the longer they are operational, the more profits they are able to produce.

Because the Takahama plant No. 1 and 2 reactors have an output as large as 826 megawatts, if their lives are extended, it is estimated that Kansai Electric will save around 10 billion yen monthly by allowing it to lower its dependency on thermal power.

Although Kansai Electric is expected to spend more than 100 billion yen to introduce additional safety measures to pass the NRA screening, there remain **safety concerns** about prolonging the operational periods of aged reactors.

Hu**ge costs for upgrading could also add a financial burden on reactor operators.**

Kansai Electric is considering decommissioning the No. 1 and 2 reactors of its Mihama plant in Fukui Prefecture, which have turned 40 years old. Considering that the reactors have a power generation capability of 500 megawatts or less, it is difficult for them to help drastically improve the company’s financial situation.

(This article was compiled from reports by Gen Kaga, Toshio Kawada, Koji Nishimura and Tomoyoshi Otsu.)

December 15, 2014

Safety screening for Oma plant

Oma plant operator to apply for govt screening

http://www3.nhk.or.jp/nhkworld/english/news/20141215_26.html

A Japanese electric power company will apply to the country's nuclear regulator on Tuesday for safety screening needed to run a power plant now under construction in the northeast of Japan.

The plant under construction is in Oma Town, Aomori Prefecture. The plant would contain the world's first nuclear reactor to operate solely on plutonium-uranium mixed oxide fuel, known as **MOX.**

The city of Hakodate in Hokkaido filed for an injunction with the Tokyo District Court in April to halt the construction. City officials fear damage from a possible accident. The city is within 30 kilometers from the nuclear site across the Tsugaru Strait.

Electric Power Development Company, or J-Power, resumed construction in October 2012. Work was suspended after the nuclear accident in Fukushima in March the year before.

The Nuclear Regulatory Authority has so far received safety screening applications for 20 reactors at 13 plants since new government regulations were introduced after the Fukushima accident. **This is the first time an operator will file for screening of a power plant under construction.**

J-Power says it is making efforts to comply with the government's new regulations. The company raised the requirements for earthquake resistance design. This includes maximum ground shaking from the current 450 to 650 gal. The utility says it will add necessary reinforcements to pipes and other structures.

J-Power also raised the assumed maximum height of tsunami from 4.4 meters to 6.3 meters. It maintains that tsunami will not reach the site, which lies 12 meters above the sea surface.

Regulators have suggested they will proceed with the screening with caution. They say **control rods used to stop nuclear fission are not as effective with MOX fuel as ordinary nuclear fuels.**

December 16, 2014

Safery screenings for Oma plant

J-Power applies for safety check of Oma nuclear plant under construction in Aomori

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201412160051

By TOSHIO KAWADA/ Staff Writer
Electric Power Development Co. (J-Power) applied Dec. 16 for safety screenings for its Oma nuclear power plant, currently under construction in Aomori Prefecture.
It marks the first screening application submitted to the Nuclear Regulation Authority for a nuclear plant under construction since new safety standards were introduced in July 2013.
J-Power estimates that the screening process will take about one year and hopes to complete construction of the plant by 2020 for the start of operations in fiscal 2021.
The Oma plant is the first nuclear power plant to be constructed and operated by J-Power, a private utility company set up through capital contributed by the central government and regional utility companies.
The Oma plant will be the world's first fully MOX nuclear facility, where only mixed-oxide (MOX) fuel, consisting of plutonium and uranium, is used. The MOX fuel is created by using plutonium produced through the processing of spent nuclear fuel.
At conventional pluthermal nuclear plants, at most one-third of the nuclear fuel is MOX fuel, with conventional uranium fuel making up the rest.
Compared with uranium fuel, it is more difficult for control rods to suppress nuclear chain reactions when MOX fuel is used, and the NRA will be focusing on whether adequate measures are being considered to deal with that factor.
Construction began in 2008, and the plant is currently 37.6 percent complete.
After the new screening standards were set, J-Power raised its projected earthquake preparedness scale from 450 gals to 650 gals.
Measured with seismographs, a gal is a unit of acceleration that measures the extent of an earthquake's seismic waves. Earthquakes with high levels of magnitude also have high gal measurements.
The anti-seismic capabilities of equipment at the plant were based on that higher projection.
Construction work on safety measures will be implemented based on the screening results.
The Hakodate city government in Hokkaido filed a lawsuit in April in the Tokyo District Court that named J-Power and the central government as defendants and called for an injunction against construction work.
Hakodate lies across the Tsugaru Strait from Aomori Prefecture and is located within a 30-kilometer radius of the Oma plant.

Construction is also proceeding at two other nuclear plants in Higashidori, Aomori Prefecture, and Shimane Prefecture, but applications for safety screenings have not yet been submitted for those two projects.

Oma plant operator applies for govt. screening

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

A Japanese power company has applied for government screening for a nuclear power plant being constructed in the north of the country.

The process is necessary under new regulations for nuclear plants issued after the 2011 Fukushima accident.

Senior officials of Electric Power Development, or J-Power, submitted the application to the Nuclear Regulatory Authority on Tuesday.

The facility in Oma Town, Aomori Prefecture, will be the world's first commercial plant with all reactors operating solely on plutonium-uranium mixed oxide fuel. Its construction was suspended after the Fukushima accident in 2011 and resumed in October 2012.

The operator says it will strengthen safety measures to comply with the revised government requirements. It has raised the maximum level of shaking projected by an earthquake from 450 to 650 gal and will make the necessary reinforcements to withstand it.

The operator's Executive Managing Director Junji Nagashima said the application was made after thorough consideration of stronger safety measures.

He said the company will continue to step up safety. It aims to begin operating the plant in fiscal 2021.

Plant operators have filed applications with the nuclear regulator for screenings of 21 reactors at 14 nuclear power stations across Japan. The Oma application is the first for a facility that is still under construction.

J-Power applies for safety screening of uncompleted Oma nuclear plant

http://mainichi.jp/english/english/newsselect/news/20141216p2g00m0dm064000c.html

TOKYO (Kyodo) -- Electricity Power Development Co. on Tuesday applied for safety screening of the Oma nuclear power plant being built in Aomori Prefecture, with a view to launching commercial operation as early as fiscal 2021.
The move by the electricity wholesaler, known as J-Power, marks the first time that the screening has been sought for a reactor under construction since the establishment of Japan's Nuclear Regulation Authority in September 2012.
The screening is likely to take one year, construction five years, while trial operation will take another year, according to J-Power.

The new plant, located on the northern tip of the main island of Honshu, would be the world's first reactor using only plutonium-uranium mixed oxide fuel.
It is expected to play an important role in Japan's fuel recycling policy as MOX fuel is produced from uranium and plutonium extracted by reprocessing used uranium fuel.
Amid concerns over nuclear safety following the March 2011 Fukushima Daiichi crisis, the city of Hakodate in Hokkaido, which is located within 30 kilometers from the plant's site across the Tsugaru Straight, has filed a lawsuit against the government and J-Power to halt the construction.
Although the construction work started in 2008 was suspended following the Fukushima accident, it resumed in October 2012.

December 17, 2014

Obstacles for OMA plant?

Rocky road ahead for MOX fuel Oma plant to undergo safety checks

http://mainichi.jp/english/english/newsselect/news/20141217p2a00m0na009000c.html

Electric Power Development Co. (J-Power) has filed its yet uncompleted Oma Nuclear Power Plant for safety checks by a government agency, but obstacles lie ahead before the plant can go online, including a **lawsuit filed by the Hokkaido city of Hakodate to suspend the plant's construction.**
The Oma plant will be the first plant still under construction to undergo a safety assessment by the Nuclear Regulation Authority (NRA). When construction is completed, it will be the world's first commercial full MOX reactor, with the benefit of using plutonium extracted from spent fuel, whose use has been difficult since the Fukushima No. 1 Nuclear Power Plant disaster broke out. J-Power expects the inspections to take about a year, and aims to begin operating the plant in the 2021 fiscal year.
This is the 21th reactor out of a total of 14 nuclear power plants that will undergo the new government safety assessment established after the Fukushima disaster. J-Power raised the estimated maximum seismic movement from an initial 450 gal to 650 gal and lifted the estimated maximum tsunami height from an initial 4.4 meters to 6.3 meters.
Control rods used to control reactor power become more difficult to manage when using MOX fuel than with uranium. MOX fuel had been used at the pluthermal No. 3 reactor of Kyushu Electric Power Co.'s Genkai power station in Saga Prefecture, but such fuel only comprised a maximum of one-third of the reactor core. The control rods, therefore, have had to be improved for the Oma plant, where MOX fuel would be used in all of its reactor cores. Attention now is on whether the NRA will deem them safe. With NRA chairman Shunichi Tanaka urging caution, the safety assessment procedure may be drawn out.
In its safety assessment application, J-Power states that spent MOX fuel will be, as a basic principle, reprocessed domestically, and that who would be entrusted with the reprocessing will be decided before the spent fuel is taken off the plant's premises. The spent fuel pool will be filled completely 20 years after the plant goes into operation. Spent MOX fuel generates more heat than standard spent nuclear fuel, and plutonium itself is highly toxic. Such fuel cannot be reprocessed at the Rokkasho Reprocessing Plant in Aomori Prefecture, so another reprocessing plant is necessary, but as of now, plans for the construction of such a plant do not exist.
On the opposing bank of the Tsugaru Strait and within 30 kilometers of the Oma plant lies part of the Hokkaido city of Hakodate, which in April filed a lawsuit with the Tokyo District Court against the central government and J-Power seeking a halt to the plant's construction. Hakodate Mayor Toshiki Kudo issued a statement saying that he regretted the submission of a safety assessment application with the expectation that the plant will go into operation.

In the town of Oma, meanwhile, residents look forward to the economic benefits of workers staying on a long-term basis, and of increased tax revenue from fixed property taxes after the plant is completed. Oma Mayor Mitsuharu Kanazawa issued a comment saying, "Finally, the day of (the application's) submission has come. It's a welcome day for our town, which has hosted and promoted the plant."

December 22, 2014

Has Monju reformed?

Monju operator to file report on inspection review

http://www3.nhk.or.jp/nhkworld/english/news/20141222_21.html

The operator of the Monju prototype fast-breeder reactor plans to submit to the government a report outlining measures **to prevent a recurrence of missed inspections.**

Last year, the Nuclear Regulation Authority, or NRA, discovered that the reactor, in Fukui Prefecture on the Sea of Japan, had missed several inspections. These included checks of critical safety equipment.

Last May, the NRA ordered the operator, the Japan Atomic Energy Agency, to forego preparations for a restart of the reactor until its safety could be verified.

The report the agency will submit on Monday says that, **after reviewing its inspection methods based on what NRA inspectors had pointed out, it found that more than 6,000 of its inspections had been inadequate.**

The report says the agency's president now directly supervises the reactor, allowing workers to focus on its operation and maintenance.

It adds that the agency has set up a new system to confirm the reliability of its equipment and to prevent inadequate inspections from going undetected.

The NRA will consider lifting its order to the agency based on the report and the results of future inspections.

January 20, 2015

Screening Oma plant

Nuclear watchdog screens first all MOX-fuel plant

http://www3.nhk.or.jp/nhkworld/english/news/20150120_22.html

Japan's Nuclear Regulation Authority has begun screening a nuclear power plant now under construction in Aomori Prefecture, northern Japan.

The Oma Plant is designed to operate solely on mixed-oxide fuel, or "MOX fuel", of uranium and plutonium taken from spent nuclear fuel. It would be the world's first commercial plant of its kind.

The first meeting for the screening was held on Tuesday. The plant's operator J-Power had applied for the process under the new regulations put in place following the 2011 Fukushima Daiichi nuclear accident.

J-Power said for the new regulations it has raised the maximum level of possible shake from an earthquake to 650 gals from 450. It will make the necessary reinforcements to withstand those conditions.

The utility also said it will use pump trucks and external power-supply cars with greater capacities to prepare for the possibility of a serious accident.

Control rods are expected to work less effectively on mixed-oxide fuel compared to normal fuels. The operator plans to use different kind of rods that would absorb neutrons more effectively as they promote nuclear fission.

A member of the regulation authority urged J-Power not to be satisfied with just meeting the government requirements since it's the firm's first nuclear power plant. He requested J-Power put in place higher safety standards than the minimum.

The MOX fuel to be used at the Oma plant generates more heat compared to ordinary fuels and begins melting at a lower temperature.
For this reason, the regulator plans to be stricter in the screening compared to other plants.

Safety review begins on the world's 1st full MOX reactor

http://mainichi.jp/english/english/newsselect/news/20150120p2g00m0dm068000c.html

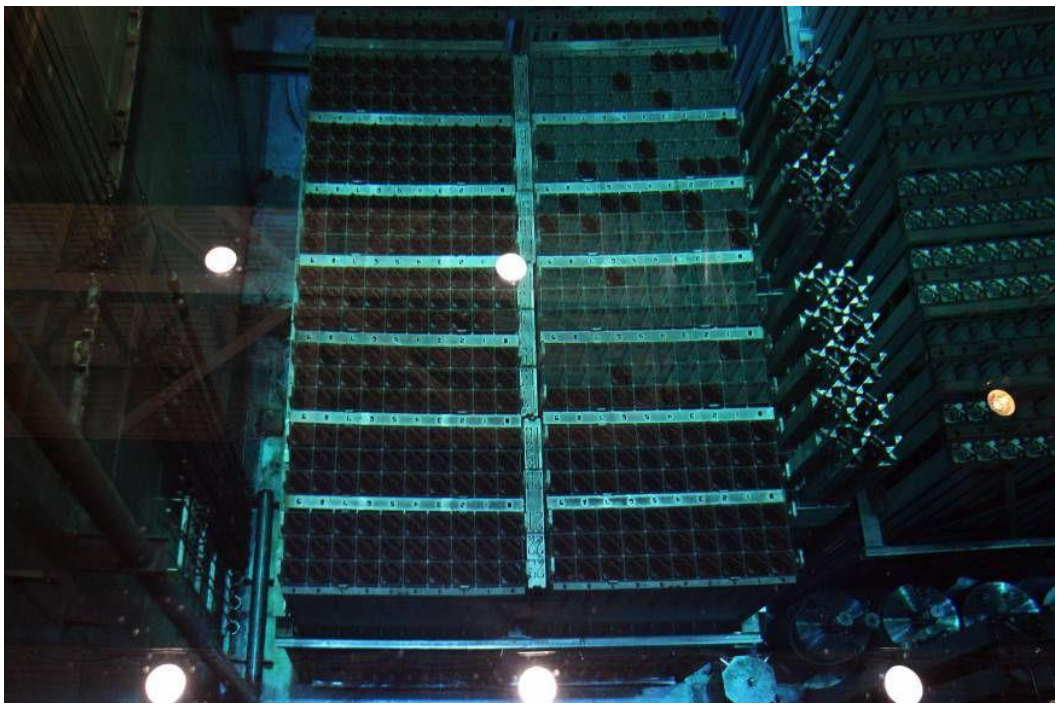
TOKYO (Kyodo) -- Japan's Nuclear Regulation Authority on Tuesday began safety screening of Electric Power Development Co.'s Oma nuclear power plant, the world's first full plutonium-uranium mixed oxide fuel reactor that is still under construction.
The electricity wholesaler, known as J-Power, hopes to start commercial operation of the reactor around fiscal 2021, but the safety checks are expected to take time as the operating characteristics of the Oma plant are different from those of conventional nuclear plants.
The checks are based on tougher regulations adopted after the Fukushima nuclear crisis and necessary for any reactor before being allowed to operate.
There is no guarantee the plant, being built in Aomori Prefecture in northeastern Japan, can begin operating as scheduled by J-Power also because of a lawsuit filed by the city of Hakodate in Hokkaido, located 23 kilometers from the facility across the Tsugaru Strait. The city is seeking suspension of construction due to safety concern.
A so-called full MOX nuclear reactor runs solely on mixed-oxide (MOX) fuel consisting of uranium and plutonium extracted by reprocessing spent uranium fuel. The Oma plant has been developed to play an important role in Japan's long-standing nuclear fuel recycling policy, which would allow it to reduce its growing plutonium stockpile -- a cause of international concern as it could be used to build nuclear weapons.
But there are also safety concerns over whether the safety of such a plant can be assured, as rods used for controlling reactor power become more difficult to manage with MOX fuel than with uranium, while MOX fuel has a lower melting temperature.
Japan has experience of operating reactors with MOX fuel loaded in one-third of their cores, but there is no example within or outside the country of a reactor operating solely on MOX fuel.
NRA Chairman Shunichi Tanaka said earlier a full MOX reactor is "unprecedented" and that the nuclear regulator will assess safety measures of the Oma plant "quite carefully."
During a meeting Tuesday, NRA Commissioner Toyoshi Fuketa called on J-Power to make efforts to realize higher level of safety than required in regulations by taking onboard the lessons learned from the Fukushima meltdowns.
"Do not assume it's enough to satisfy the level of safety that (used to be applied for plants) built 10 or 20 years ago," he said.
The state approved construction of the Oma plant in 2008. But after about 40 percent of the construction had been completed, work was suspended in the wake of the disaster at Tokyo Electric Power Co.'s Fukushima Daiichi nuclear power plant triggered by a huge earthquake and tsunami in March 2011.

February 22, 2015

MOX enormously expensive

MOX imports have cost at least ¥99.4 billion, much higher than uranium fuel

http://www.japantimes.co.jp/news/2015/02/22/national/mox-imports-have-cost-at-least-%C2%A599-4-billion-much-higher-than-uranium-fuel/#.VOmX1i51Cot



Channel boxes containing fuel rods with plutonium-uranium mixed oxide (MOX) lie in a pool in the building housing the No. 3 reactor at Tokyo Electric Power Co.'s Fukushima No. 1 nuclear power station in the town of Okuma in August 2010. | BLOOMBERG

JIJI

Five nuclear plant operators have spent at least ¥99.4 billion on imports of plutonium-containing mixed oxide (MOX) fuel since it was first shipped to Japan in 1999, Jiji Press learned on Saturday.

Some of the imports cost nine times more than conventional uranium fuel. The MOX expenses are partly reflected in monthly electricity bills.

The MOX fuel, a mixture of plutonium extracted from spent nuclear fuel and uranium, is a core component of Japan's nuclear fuel cycle. But the use of the fuel has drawn criticism for its high costs.

Japanese power companies that use or plan to use the MOX fuel commission the fuel's production from companies in France and elsewhere.

The five that imported MOX fuel are Tokyo Electric Power Co., Chubu Electric Power Co., Kansai Electric Power Co., Shikoku Electric Power Co. and Kyushu Electric Power Co., according to the Federation of Electric Power Companies of Japan.

Of the five, Kansai Electric, Shikoku Electric and Kyushu Electric have revised their monthly power rates to reflect the cost of using MOX fuel.

Since 1999, MOX fuel has been shipped to six of the five companies' nuclear power stations. Trade statistics compiled by the Finance Ministry and other data show that the imports since that time have totaled ¥99.437 billion, including the costs of transportation and insurance.

In June 2013, Kansai Electric imported 20 units of MOX fuel assemblies from France for ¥18.514 billion for use at the No. 3 and No. 4 reactors at the Takahama power station in Fukui Prefecture.

The average cost per unit stood at ¥925 million, compared with the average of around ¥103 million for 60 units of conventional uranium fuel that Kansai Electric imported from the United States between October and November that year, also for use at the two reactors.

All five power companies declined to disclose MOX fuel costs, citing **confidentiality of MOX fuel procurement contracts.**

Japanese power companies use MOX fuel by mixing it with conventional uranium fuel. The share of the MOX fuel in the total fuel used has been limited to around 30 percent so far. The Oma nuclear power

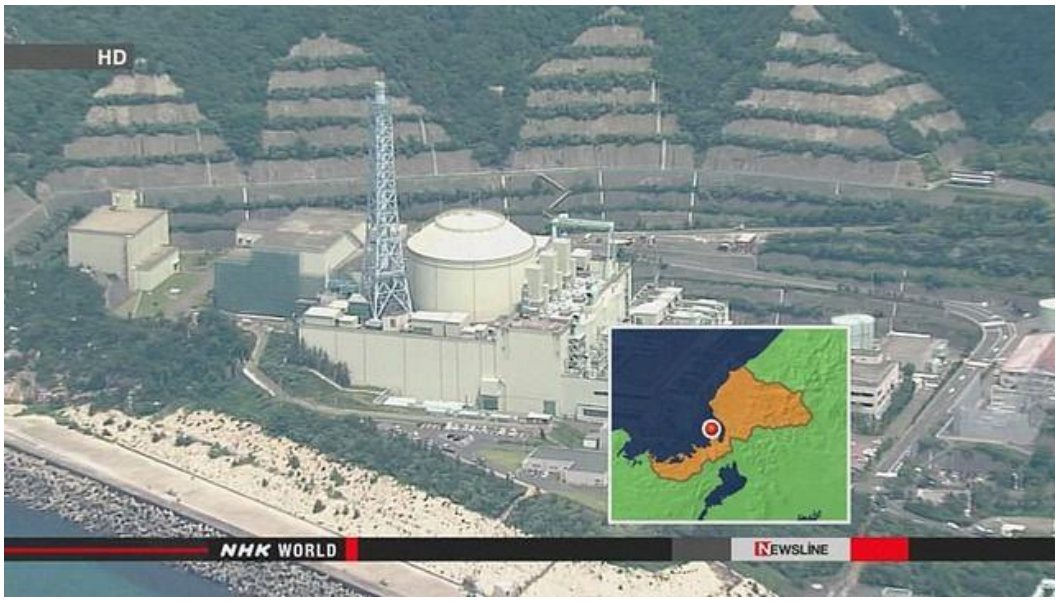
station of the Electric Power Development Co. (J-Power), which is under construction, will be the first one that will rely entirely on MOX fuel.
The use of MOX fuel in Japan is being halted because all commercial reactors still remain idle nearly four years after the nuclear disaster at Tepco's Fukushima No. 1 power station began in March 2011. The federation planned to have MOX fuel used at 16 to 18 reactors across Japan by fiscal 2015, but the plan was put off.

March 2, 2015

Can Monju ban be lifted?

Lifting of Monju operation ban uncertain

http://www3.nhk.or.jp/nhkworld/english/news/20150302_22.html



A senior official of Japan's Nuclear Regulation Authority's secretariat has indicated that he has no idea when it can lift an effective ban on test runs for the prototype fast-breeder reactor Monju.

Noboru Hirose made the remark on Monday at the start of 3 weeks of regular safety checks on the reactor in Tsuruga City, Fukui Prefecture, central Japan.

Regulators ordered the effective ban on preparations for test runs 2 years ago following a series of problems, including missed inspections on many pieces of equipment.

Monju's operator, the Japan Atomic Energy Agency, hopes to lift the ban by the end of this month.
Hirose said he wants to have a first-hand look at how the safety checks are conducted and whether measures to prevent similar problems are adequate.

Monju chief Kazumi Aoto said he hopes the authority will evaluate positively the operator's efforts to address problems and reform operations.

But Hirose said it will not be able to lift the ban this month and that it is too early to say when it can.

Monju was shut down for about 14 years after a sodium leak in 1995. The operator restarted the reactor in 2010, but a trouble occurred after just 3 months and operations have remained stopped since then.

Experts say a fast-breeder reactor has the potential to generate more nuclear fuel than it consumes.

March 4, 2015

More than 6 months to lift ban?

Lifting ban on Monju tests to take over 6 months

http://www3.nhk.or.jp/nhkworld/english/news/20150304_29.html

Japan's nuclear regulator says lifting an effective ban on test runs at the troubled Monju fast-breeder reactor will take more than 6 months.

Monju is a prototype in Fukui Prefecture, central Japan, built to reuse spent nuclear fuel in form of MOX fuel -- a mixture of plutonium extracted from spent fuel, and uranium.

Officials of the Nuclear Regulation Authority's secretariat made the remark at an NRA commissioners' meeting on Wednesday.

The officials said at least 3 rounds of quarterly safety inspections, including one that started on Monday, are needed to check whether the reactor's operator makes improvements.

The ban came in May 2013 following a series of problems including missed safety checks involving equipment crucial for safe operations.

Monju's operator, Japan Atomic Energy Agency, has proposed a set of measures to prevent a recurrence, in hopes of having the ban lifted this month.

NRA Chairman Shunichi Tanaka said at the meeting that the operator must become more aware of the need to take swift steps.

Commissioner Kayoko Nakamura said the secretariat has spent enormous energy on the problem, and that the operator must work with a sense of crisis.

Monju's test operation stopped after a sodium leak there 20 years ago. Sodium is used as coolant in the reactor, but is difficult to handle. The reactor resumed test runs in 2010, but various problems occurred.

March 5, 2015

Monju: Safety measures not sufficient

Nuclear regulator says preventive measures lacking for Monju fast-breeder reactor

http://mainichi.jp/english/english/newsselect/news/20150305p2a00m0na014000c.html

The Nuclear Regulation Authority (NRA) said on March 4 that the Japan Atomic Energy Agency (JAEA) had not taken sufficient measures to prevent its Monju fast-breeder reactor in Fukui Prefecture from experiencing trouble.

In May 2013, the NRA issued an order to effectively halt the operation of the Monju fast-breeder reactor because JAEA failed to inspect a huge number of reactor components. JAEA, the operator of the reactor, then submitted reports seeking the lifting of the order. In response to JAEA's reports, the NRA said on March 4, "Preventative measures have not been fully taken." It now has become difficult for the NRA to lift the order by the end of this year because the nuclear regulatory agency, the NRA's secretariat, says the Monju reactor should go through at least three quarterly inspections to have the ban lifted.

It came to light in November 2012 that JAEA had failed to conduct inspections on nearly 10,000 components. In May 2013, the NRA ordered JAEA to suspend preparatory work for restarting the reactor until it rebuilds a maintenance and management system for the facility. In December 2014, JAEA submitted three reports in a bid to have the order lifted, but it was subsequently found to have erred in tallying the number of components it had yet to inspect. JAEA then amended and resubmitted some of the documents in February this year.

At the NRA's regular meeting on March 4, the nuclear regulatory agency revealed that it had instructed JAEA to recheck 4,967 components the operator had put off inspecting on the grounds that they "do not affect the reactor facility." Regarding the errors in tallying the number of inspected components, the agency also said that it had instructed JAEA to "verify the fundamental cause and take necessary measures."

JAEA had sought the lifting of the order by the end of this month, but it will be delayed for a considerable period of time because the NRA needs to check the credibility of JAEA's reports and it must conduct on-site work to check the safety of the facility. NRA Chairman Shunichi Tanaka said at the March 4 regular meeting, "There is still a long way to go (before lifting the order). We are not in a situation where we can say in a carefree fashion that it cannot be lifted within the current fiscal year."

The Monju fast-breeder reactor is believed to produce more plutonium than it consumes after using plutonium extracted from spent fuel as nuclear fuel. It first started operations in 1994, but it has remained offline for a long time due to a string of accidents and trouble. In the government's basic energy program, the Monju reactor is regarded as a research facility designed to reduce radioactive waste.

March 20, 2015

Citizens' suit to halt MOX plan rejected

Lawsuit targeting Genkai nuclear plant's MOX plan rejected

http://www.japantimes.co.jp/news/2015/03/20/national/lawsuit-targeting-genkai-nuclear-plants-mox-plan-rejected/#.VQwym-F1Cos

Kyodo

SAGA – The Saga District Court on Friday rejected a suit seeking to block Kyushu Electric Power Co.'s plan to use plutonium-uranium mixed oxide fuel (MOX) at the Genkai power plant in Saga Prefecture.
"Any danger has not been proven," the court said as it handed down the nation's first ruling on the legality of burning the controversial fuel in reactors.
Kyushu Electric is waiting for the Nuclear Regulation Authority to approve its application to restart the Genkai plant's No. 3 reactor, which is designed to run on both MOX and standard uranium fuel.
MOX fuel is controversial because it is made with weapons-grade plutonium, which could prove to be much more dangerous in a nuclear accident.
In the suit, a citizens group in the city of Saga argued that the nuclear reaction of the MOX fuel to be burned in the No. 3 reactor is more difficult to control than typical uranium fuel and poses a more serious accident risk.
Specifically, the plaintiffs argued that a gap could develop between the MOX fuel and its tubular container, and the hollow would further separate the fuel from the cooling water outside the tube, making cooling ineffective and leading to a grave accident, such as a meltdown.
The court ruled such a gap is unlikely to emerge or cause a core meltdown.
The group's argument is based on data for a foreign nuclear power plant with specifications different from the Genkai plant, the ruling said.
"Kyushu Electric has evaluated the safety of the MOX fuel in the strictest way and fulfilled safety standards," it said.
Kyushu Electric hailed the ruling. "The court accepted our claim that we have secured safety."
But plaintiffs and their supporters denounced the ruling as unreasonable and said they will appeal.
The reactor in 2009 became the first in Japan to use MOX fuel but has been offline since 2010. The MOX fuel it will use if allowed to restart is produced by France's Melox S.A.

March 21, 2015

Court rejects suit seeking halt to MOX use at Genkai nuclear plant

http://mainichi.jp/english/english/newsselect/news/20150321p2g00m0dm012000c.html

SAGA, Japan (Kyodo) -- The Saga District Court on Friday rejected a suit seeking a halt to the planned use by Kyushu Electric Power Co. of plutonium-uranium mixed oxide fuel at its Genkai nuclear power plant in Saga Prefecture, southwestern Japan.
"Any danger has not been proven," the court said as it passed the first court ruling in Japan over the legality of MOX use at a reactor.
Kyushu Electric is seeking approval from the Nuclear Regulation Authority to restart the Genkai plant's No. 3 reactor, which is designed to run on both MOX fuel and uranium fuel.
In the suit, a citizens group in the city of Saga argued that the nuclear reaction of the MOX fuel to be used in the No. 3 reactor is more difficult to control than that of uranium fuel and poses the risk of a serious accident.
Specifically, the plaintiffs argued a gap could develop between the MOX fuel and its tube container and the hollow would distance the fuel from cooling water outside the tube, making cooling ineffective and leading to a grave accident such as a meltdown.
The court ruled such a gap is unlikely to emerge or cause a meltdown of the fuel.
The group's argument is based on data for a foreign nuclear plant whose specifications are different from those of the Genkai plant, the ruling said. "Kyushu Electric has evaluated the safety of the MOX fuel in the strictest way and fulfilled safety standards," it said.
Kyushu Electric hailed the ruling. "The court accepted our claim that we have secured safety."

But plaintiffs and their supporters denounced the ruling as unreasonable, and the plaintiffs said they will appeal it.
The reactor in 2009 became the first in Japan to use MOX fuel. It has been offline since 2010.
The MOX fuel it will use if allowed to restart is produced by France's Melox S.A.

March 23, 2015

Preventive measures still not implemented at Monju reactor

JAEA declares prototype fast-breeder reactor safety measures sufficiently improved

http://mainichi.jp/english/english/newsselect/news/20150323p2a00m0na003000c.html

The Japan Atomic Energy Agency (JAEA) reported to the government on March 23 that it has sufficiently improved safety measures on its troubled Monju fast-breeder nuclear reactor, which remains shut down on Nuclear Regulation Authority (NRA) orders.
"All countermeasures have been implemented and positive results have been produced," says the report on the maintenance and management of the prototype reactor in Fukui Prefecture, submitted by JAEA President Shojiro Matsuura to Education, Culture, Sports, Science and Technology Minister Hakubun Shimomura.
However, the report failed to convince Shimomura.
"It's necessary for the JAEA to make further efforts to raise employee awareness of maintenance and management and to improve their skills," the science minister said. "The agency's efforts are still not enough to win public understanding."
Matsuura, whose current term as JAEA president ends on March 31, acknowledged that its efforts remained insufficient.
"I think the maintenance and management system has been established, but more efforts are needed to make sure that the system takes root at the plant."
The NRA effectively banned the JAEA from operating the Monju reactor in May 2013 after it came to light that maintenance workers failed to check numerous inspection items at the plant.
The JAEA had aimed to have the ban lifted by the end of March. However, the NRA pointed out earlier this month that the agency had still failed to fully implement preventive measures, and the lifting of the ban will likely be delayed.

March 25, 2015

More problems with Monju fast-breeder reactor

More flaws found with Monju plant inspections

http://www3.nhk.or.jp/nhkworld/english/news/20150325_35.html

Nuclear regulators have found further problems with the inspection methods of the operator of the Monju fast-breeder reactor in Fukui Prefecture, on the Sea of Japan coast.

The Monju plant was shut down after a sodium leak was discovered in 1995. The plant was restarted on a test basis in 2010, but was soon shut down again due to a series of problems. Further test runs

were banned in May 2013 over safety inspection oversights involving key equipment.

The reactor's operator, Japan Atomic Energy Agency, submitted a report on the problems to the Nuclear Regulation Authority last December.

Nuclear regulators met on Wednesday to discuss the operator's progress.
But the regulators heard that the operator had failed to carry out ultrasonic tests every 16 months as mandated to check the condition of pipes carrying coolant water.

The operator also failed to properly inspect the pipes where they intersect the walls of the reactor building. These spots require special checks because they cannot be visually inspected.

Authority Chairman Shunichi Tanaka censured Japan Atomic Energy Agency for its failure to properly inspect the pipes.

He said the company is not qualified to be in the atomic power business if it cannot be relied upon to manage the plant properly and conduct thorough inspections.

March 26, 2015

Monju: New maintenance errors

More errors with Monju nuclear reactor maintenance found

http://mainichi.jp/english/english/newsselect/news/20150326p2a00m0na007000c.html

Several more maintenance problems have been discovered at the Monju fast-breeder reactor facility in Tsuruga, Fukui Prefecture, which has been banned from operation following the discovery of over 10,000 cases of maintenance errors in 2013, it has been learned.
The Nuclear Regulation Authority (NRA) secretariat revealed on March 25 that the newly discovered maintenance errors -- which involve the facility's piping system -- mean that Monju operator Japan Atomic Energy Agency (JAEA) may have violated safety regulations.
The NRA secretariat conducted safety inspections on pipes and other components at the troubled Monju facility between March 2 and 20. JAEA is responsible for checking the thickness and corrosion of the cooling pipes and the pipes for liquid sodium circulation, but the agency has failed to conduct the checks properly, only conducting visual inspections of the pipes, it is reported.
The NRA secretariat plans to report the matter to the NRA as early as May this year after examining details of the inspection and confirming the number of maintenance errors.
While an NRA secretariat representative said it has been confirmed at the inspection that the errors are not imminent threats to the safety of the facility, JAEA's latest failure may further delay the restart of the Monju reactor.

April 27, 2015

Reprocessing "essential" says JNFL

Nuclear Fuel Reprocessing Essential For Long-Term Plans, Says JNFL

http://www.nucnet.org/all-the-news/2015/04/27/nuclear-fuel-reprocessing-essential-for-long-term-plans-says-jnfl

Japan has identified the reprocessing of nuclear fuel as the "essential factor" for the long-term use of nuclear energy, Harukuni Tanaka, senior managing executive officer of Japan Nuclear Fuel Limited (JNFL), said at the World Nuclear Fuel Cycle conference in Prague last week.
Mr Tanaka said the target for the share of nuclear energy in the energy mix in 2030 is under discussion in a special advisory council set up by the government, but nuclear has been identified as one of the "important base-load power generating methods".

Mr Tanaka said nine nuclear units in Japan plan to use mixed-oxide (MOX) fuel if they are allowed to restart operation by the country's Nuclear Regulatory Authority (NRA). These are made up of five pressurised water reactors (PWRs) and four boiling water reactors (BWRs), which are under inspection to ensure they meet safety standards introduced following the March 2011 Fukushima-Daiichi accident.

The PWRs are Takahama-3 and -4, Genkai-3, Ikata-3, and Tomari-3. The BWRs are Shimane-2, Hamaoka-4, Tokai-2, and Ohma-1.

Mr Tanaka said JNFL hopes to obtain a licence to operate Japan's MOX fuel fabrication plant (JMOX) at Rokkasho by October 2017. The facility's safety design is being assessed by the NRA under the new requirements.

Japan has experience in processing spent nuclear fuel at its Tokai plant which started operation in 1977 and completed its last reprocessing service contract in 2006. The plutonium recovered from processing was sent to France for MOX fuel fabrication.

Fuel from Japan's reactors has also been reprocessed at Areva's facilities at La Hague in northern France and the MOX manufactured at Areva's Melox plant in the Rhone valley.

JMOX will receive MOX powder from JNFL's Rokkasho processing plant. The two facilities are connected through an underground tunnel to protect the transfer of "sensitive" materials, Mr Tanaka said.

The processing plant is being inspected by the NRA to determine whether it conforms to the new safety standards, but JNFL hopes to obtain an operating licence by March 2016, Mr Tanaka said. JNFL has started upgrading the plant's safety functions for design-basis accidents as well as severe accidents, he said.

When operational, the processing plant will be able to treat up to 800 tonnes of spent fuel per year. JMOX will have a maximum capacity of 130 tonnes of heavy metal per year.

Mr Tanaka said 12 reactor units were either using or under regulatory review to begin using MOX fuel before the Fukushima-Daiichi accident.

Tokyo Electric Power Company (Tepco) was operating one unit, Fukushima-Daiichi-3, with MOX fuel when the accident occurred.

Tepco had also prepared fresh MOX fuel for its Kashiwazaki-Kariwa-3 unit, but has applied for restart permission from the NRA for Units 6 and 7 only.

A regulatory review was completed of Tohoku Electric's Onagawa-3 so it can begin using MOX, but the company has not yet submitted an application to the NRA to restart the unit.

MOX fuel consists of a mix of uranium and plutonium oxides recovered from used nuclear fuel. More than 30 nuclear reactors in Belgium, France, Germany and Switzerland use MOX fuel, typically as one third of their cores. Some units can use up to 50 percent MOX and some modern designs could use 100 percent MOX.

June 15, 2015

Rokkasho: New delays

Nuclear Fuel again faces delay in fuel cycle project

http://www.japantimes.co.jp/news/2015/06/15/national/japan-nuclear-fuel-again-faces-delay-in-fuel-cycle-project/#.VX7qm0bwmos

JIJI
Japan Nuclear Fuel Ltd. looks certain to face a fresh delay in the completion of its spent fuel reprocessing plant in Rokkasho, Aomori Prefecture, as regulators are unlikely to end their safety checks by the end of this month, as the company had expected.
With no prospect in sight for the end of the Nuclear Regulation Authority's safety screening, it is uncertain whether Japan Nuclear Fuel will be able to complete the plant by the end of March 2016, as currently scheduled, sources familiar with the situation said Monday.
The plant, a core facility of Japan's nuclear fuel cycle project, is designed to extract uranium and plutonium from spent fuel, while solidifying other high-level radioactive waste from the reprocessing process by mixing them with glass to make their storage easier.
Due to a series of problems, Japan Nuclear Fuel has postponed the facility completion a total of 21 times. It is owned by companies, including nine major electricity firms with nuclear plants and Japan Atomic Power Co.
Some ¥2.2 trillion has been spent on the plant so far, nearly triple the initial estimate. Funds are procured via electricity fees.
In January last year, Japan Nuclear Fuel applied for safety checks by the NRA for the plant's commercial operations, based on new safety standards introduced in July 2013 reflecting lessons from the Fukushima crisis.
When Japan Nuclear Fuel submitted the safety check application, it assumed that the NRA would finish its screening in six months. After the NRA pointed out a number of problems, Japan Nuclear Fuel revised its assumption and said it expected the screening to be ended by this month.
But it now looks looks impossible to gain safety approval from the NRA by the end of this month because it has failed to provide convincing explanations about measures for responding to severe accidents and its projection for the maximum strength of earthquakes that could hit the plant, the sources said.
Japan Nuclear Fuel's scenario was that after the facility passes NRA checks, it would be able to complete work in nine months to improve safety measures at the plant to meet the new standards.
A Japan Nuclear Fuel official said, however, that "as the work period can be shortened, there is no change in the schedule to complete the facility by March next year even if the NRA's safety checks are not finished by the end of this month."
The facility has a storage pool with a capacity to store up to 3,000 tons of spent fuel. Some 98 percent of this capacity has been taken by spent fuel from nuclear plants across the country.

With the facility having little room for more fuel, Japan could face problems in storing spent fuel if idled reactors resume operations.

August 3, 2015

Monitoring devices at Rokkasho plant not working

Monitors fail at nuclear fuel reprocessing plant

http://www3.nhk.or.jp/nhkworld/english/news/20150803_11.html

A nuclear fuel reprocessing firm in northern Japan says some of its monitoring devices of high level radioactive materials have stopped working. It says the failure poses no threat to the environment.

Japan Nuclear Fuel Limited reported the troubles at a plant compound in Rokkasho Village, Aomori Prefecture, on Sunday evening.

It said 4 monitoring devices failed at about the same time at the plant's facility. The facility extracts uranium and plutonium from melted spent nuclear fuel while separating highly radioactive wastes.

The failed devices include a leak monitor for highly radioactive liquid-waste as well as a pressure monitor for an exhaust gas processing system.

The Aomori Prefectural government and the firm say workers are currently unable to monitor any potential leak inside the facility. But the firm also stresses that other devices in the plant indicate no radioactive leaks outside the facility.

The company says when the failure occurred lightning strikes were observed near the plant. It says it is studying whether there is a connection.

The plant has not been running at full capacity, as it has been undergoing government screening ahead of the planned formal launch in March.

August 2, 2015

More problems at Monju plant

New maintenance breaches found at Monju plant

http://www3.nhk.or.jp/nhkworld/english/news/20150805_28.html

Japanese government inspectors have disclosed a violation of maintenance rules at the Monju fast-breeder reactor in Fukui Prefecture.

A report cites 800 cases of repair request documents being improperly stored.

The Monju plant, on the Sea of Japan coast, has an extensive history of safety problems. Monju was

shut down after a sodium leak in 1995. It was restarted on a test basis in 2010, but was soon taken offline again due to a series of problems.

The Nuclear Regulation Authority has effectively banned test runs at Monju since May 2013. It asked the plant's operator, the Japan Atomic Energy Agency, to draw up a plan for improved maintenance. The operator submitted the plan last December.

Government officials reported the latest breaches to the authority on Wednesday. Their findings are from a follow-up inspection in June.

The operator says the improper storage of the documents posed no safety risk, because the repairs were carried out based on a computerized list that's not a part of the maintenance procedure.

Yet the authority has determined the practice to be a safety violation, noting similarities with previous problems at the plant.

Inspectors also learned that some records that are required to be kept for 10 years were missing.

The authority says it plans to step up its monitoring, describing the situation at Monju as serious.

August 20, 2015

High time to drop nuclear fuel cycle

Editorial: Use wisdom in drawing curtain on nuclear fuel cycle

http://mainichi.jp/english/english/perspectives/news/20150820p2a00m0na016000c.html

With the recent reactivation of the No. 1 reactor at the Sendai Nuclear Power Plant in Kagoshima Prefecture, the government has moved a step ahead with a policy for maintaining nuclear power. To keep in tandem with that move, a working group of the Ministry of Economy, Trade and Industry in July began looking into measures to maintain the nuclear fuel cycle. While the move is aimed at improving the environment for nuclear power businesses amid liberalization of the electricity market, it is posing serious problems.

Under the nuclear fuel cycle, spent fuel from nuclear plants is reprocessed to extract plutonium for reuse as fuel. While the project is promoted as part of Japan's national policy, the actual reprocessing of spent fuel is undertaken by Japan Nuclear Fuel Ltd., a company jointly invested in by power companies. **If free competition progresses in the electricity market, utilities would not be able to secure as much profit as before and some might no longer be able to support Japan Nuclear Fuel.**

The ministry's working group is considering intensifying government involvement in the nuclear fuel cycle to keep the project afloat. The group is also mulling more secure ways to raise a total of 12.6 trillion yen in operating costs for the project.

Currently, the cost for reprocessing spent nuclear fuel is tacked on to electricity bills. If the government is to step up its involvement in the project, it will need to seek public consensus over its relevance, including the additional public financial burden.

The nuclear fuel cycle has been riddled with major problems in terms of technology, safety and costs. The completion of Japan Nuclear Fuel's reprocessing plant under construction in Rokkasho, Aomori Prefecture, has been postponed 22 times following regular trouble. The construction cost has already tripled from the initial estimate of 760 billion yen, and could further snowball for safety and

other necessary measures. The development of a fast-breeder reactor, which is supposed to act as "wheels on a car" for the nuclear fuel cycle along with the reprocessing project, has been stalled at the stage of operating the Monju prototype reactor, with no prospects for putting it into practical use. The so-called "pluthermal" project using plutonium in conventional light-water reactors is not making as much progress as expected.
There also lies a serious problem in plutonium extracted in the reprocessing of spent fuel from the viewpoint of nuclear non-proliferation. Japan currently possesses more than 47 metric tons of plutonium at home and abroad, and if the country is to produce additional plutonium that could be diverted to military use with no destination for consumption amid lowering the dependence on nuclear power, the international community would only grow suspicious about such possession.
In the wake of the Fukushima No. 1 nuclear plant disaster, the Japan Atomic Energy Commission released an assessment showing that the direct disposal of spent nuclear fuel over the next 20 to 30 years would be equal or even more advantageous compared to reprocessing such fuel in terms of economic efficiency, nuclear non-proliferation and other effects. Given such estimates, the government should focus its efforts not on measures to prolong the nuclear fuel cycle but on putting forth steps to draw a curtain on the project.
If the reprocessing of spent fuel is to be terminated, Aomori Prefecture would demand that such fuel it has thus far accommodated should be brought back to where it was originally generated. Such a project termination would also cause **problems to local employment and the disposal of existing plutonium**. The government should rather rack its brain over how to resolve these issues.

September 3, 2015

Fresh faults found with Monju management

Errors found in safety management of Monju reactor

http://www3.nhk.or.jp/nhkworld/english/news/20150903_28.html

Japan's nuclear regulators have found fresh faults with the safety management of the country's fast-breeder reactor, which is currently offline.

They say they have found thousands of errors in safety classifications of the equipment and devices at the Monju reactor.

The operator of the prototype reactor in Fukui Prefecture, central Japan, has been banned from conducting test runs since 2013 following discoveries of a large number of safety inspection oversights.

The Nuclear Regulation Authority says it has recently found at least 3,000 mistakes with safety classifications of equipment and devices at the reactor during its regular inspections which are conducted 4 times a year.

Its officials say, equipment and devices with high importance were, in some cases, classified in lower ranks in the 3-level system, which suggest the operator might have failed to carry out necessary inspections for them.

The errors found recently include those going as far back as 2007. The fact suggests that government inspectors have also overlooked the operator's mistakes.

The operator, Japan Atomic Energy Agency, built the Monju fast-breeder reactor in the early 1990s to reuse the spent nuclear fuel MOX, a mixture of plutonium extracted from spent fuel and uranium.

But it has been offline for most of the period after it underwent a fire from a leak of sodium, the reactor's coolant, in 1995.

The operator aims to conduct the reactor's test run by next March. But it is uncertain when the ban by the authority will be lifted.

The plant's director, Kazumi Aoto, says he will take the government's report seriously.

An NRA inspector, Yutaka Miyawaki, says the regulators will try to identify the actual effects of the errors.

September 30, 2015

NRA: Is Monju's operator qualified for the job?

NRA criticizes Monju operator

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's nuclear regulatory authority will question the chief of the organization operating the country's fast-breeder reactor, following discoveries of a range of safety problems.

In 2013, the Nuclear Regulation Authority ordered the Japan Atomic Energy Agency, the operator of the Monju prototype fast-breeder reactor, to enforce a virtual ban on test-runs. The order came because a large number of safety oversights had been found.

Even after that, many safety issues have been discovered. A number of errors were found in the safety classifications of the equipment and devices at the reactor last month.

NRA officials reported at a meeting on Wednesday that they were unable to grasp the exact nature of the problems, due to the operator's poor handling of the data.

At the meeting, some NRA commissioners said nobody would trust the operator because there have been so many problems.

NRA Chairman Shunichi Tanaka called the situation very serious. He said the matter would cast doubt on whether the operator is qualified to run the reactor.

The authority has decided to ask the operator to submit a report on the latest problems by October 21st. They will also question the president of the operator Toshio Kodama about the management of his organization.

NRA Chairman Tanaka later suggested at a news conference that the ban on test-runs for the Monju fast-breeder reactor would remain.

The operator pledged to take seriously the regulator's request for a report and to continue to improve its procedures, putting the top priority on safety.

October 6, 2015

Temporary waste storage: Convincing municipalities

Govt. sets plan to promote nuclear waste storage

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's government plans to make it easier for municipalities to accept radioactive waste from nuclear power plants.

The government is promoting a program to reprocess spent nuclear fuel for reuse. But a reprocessing plant under construction at Rokkasho Village in northern Japan has not been able to fully accept such fuel due to a series of problems.

The uncollected fuel remains in pools at nuclear plants across the country. Some pools could fill up as more reactors are restarted.

The plan finalized on Tuesday is aimed at pushing for building intermediate storage facilities and introducing so-called dry cask storage systems.

It calls for setting up a council of officials from the central government and power company, and urging each firm to draw up a specific plan to urge local governments to accept nuclear waste.

The plan also includes **increasing grants to local governments based on how much nuclear waste they accept.**

Municipalities are wary of having to keep nuclear waste for long periods. The government and power companies face the challenge of convincing municipalities that the waste will be kept there safely and temporarily.

October 7, 2015

Monju: Faults unlikely to move

Panel: Faults under Monju reactor unlikely to move

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

A team of experts has agreed that the faults beneath a fast-breeder reactor in central Japan are unlikely to move.

The 4 experts discussed the faults under the Monju reactor in Fukui Prefecture at a meeting on Wednesday. They are members of a Nuclear Regulation Authority panel.

The experts examined data submitted by the reactor's operator, the Japan Atomic Energy Agency. The data included an analysis of minerals in the faults.

The members agreed that **it is unlikely the faults had shifted in the past 120,000 to 130,000 years.** New regulations used by the NRA define a fault as potentially active if it shifted within that time.

But the experts also pointed out the need to study whether movement at an active fault running west of the facility might cause the faults under the Monju reactor to shift too.

The members agreed to compile a final report after carrying out onsite surveys of the active fault.

In 2013, many safety inspection oversights were uncovered at the Monju reactor. Its operator has since been banned from conducting test runs.

In August, the regulators found thousands of fresh errors in safety classifications of the equipment and devices at the reactor.

October 13, 2015

The less reprocessing the safer

Obama adviser raises concerns about Japan's plutonium stockpile

http://ajw.asahi.com/article/behind_news/politics/AJ201510130012

An adviser to U.S. President Barack Obama expressed concerns about Japan's plan to reprocess its spent nuclear fuel, citing the ever-increasing plutonium stockpile already in the nation's possession.
"In the case of Japan, where there is already a sizable stockpile of separated plutonium, we would prefer not to see it grow," John Holdren said in an interview with The Asahi Shimbun in Tokyo.
Holdren, who advises Obama on science and technology issues, was in Japan for a meeting of the Joint High-Level Committee on U.S.-Japan Science and Technology Cooperation.
The Obama administration has called on all nations to minimize the amount of plutonium possessed because it could be converted for use in nuclear weapons. U.S. officials feel that limiting plutonium is important to promote nuclear nonproliferation and prevent terrorist acts using nuclear weapons.
"The United States has taken the position that it is preferable that countries that are currently not reprocessing should not go into it," Holdren said. "Since reprocessing leads to separated plutonium and, in principle, separated plutonium can be used to make nuclear weapons, our general view is that less reprocessing in the world is better than more."
Japan has commissioned Britain and France to reprocess its spent nuclear fuel to extract plutonium. At the end of 2014, Japan had a plutonium stockpile of 47.8 tons, stored both in Japan and abroad. At the end of 2000, Japan's plutonium stockpile was 37.2 tons.
As part of its nuclear fuel recycling program, Japan has been pushing its pluthermal plan that involves mixing plutonium with uranium to produce plutonium-uranium mixed oxide (MOX) fuel.
However, the 2011 disaster at the Fukushima No. 1 nuclear power plant has clouded the future of the pluthermal project. That, in turn, has led to an increase of Japan's plutonium stockpile to **an amount that could produce about 6,000 nuclear warheads.**
Although Japan has scant prospects for moving ahead with the pluthermal program, it has not abandoned plans to start up its own spent fuel reprocessing facility. Japan Nuclear Fuel Ltd. is seeking to complete such a reprocessing facility in Rokkasho, Aomori Prefecture, by March 2016.

Regarding the reprocessing facility, Holdren said: “Japanese authorities are in the process of looking at whether they will approve starting the Rokkasho plant. That is a decision for the Japanese authorities, not for the United States, to make.”
In autumn 2012, the Democratic Party of Japan-led government headed by Prime Minister Yoshihiko Noda came out with a new energy policy to shut down all nuclear plants in the nation. U.S. officials raised concerns with their Japanese counterparts about the handling of excess plutonium because the Noda administration did not provide a clear stance regarding the reprocessing of spent nuclear fuel.
In early September 2015, 14 U.S. experts, including Joseph Nye, a Harvard University professor who once served as assistant secretary of defense, submitted a letter to the U.S. Energy Department calling on the United States to abandon its own plan to construct a MOX fuel plant and to persuade Japan to suspend plans to operate the Rokkasho facility.
The letter also urged the U.S. government to ask China and South Korea to review their own plans to one day construct a spent fuel reprocessing facility.
The U.S. think tank Nonproliferation Policy Education Center was involved in putting together the letter signed by the 14 experts, including Henry Sokolski, the NPEC executive director.
The letter said that “in addition to saving money, ending the current MOX program would be in the (United States’) national security interest.”
The position of the U.S. government has been not to reprocess spent nuclear fuel from reactors. Instead, its long-term plan is to store such spent fuel in a specialized facility before constructing a final disposal site.
Washington has also signed an agreement with Moscow about reducing their respective nuclear arsenals. Under that agreement, a MOX production plant to be constructed in North Carolina would process 34 tons of plutonium extracted from dismantled nuclear weapons. The MOX fuel would then be used in nuclear plants.
However, rising construction costs have pushed back those plans. The projected cost is now about $7.7 billion (about 930 billion yen), several times the initial estimate. Although the initial planned completion date was autumn 2016, there will be a major delay in completing the project.
(This article was written by Takashi Oshima in Tokyo and Tetsu Kobayashi in Washington.)

October 22, 2015

Promotion of nuclear fuel recycling will continue

Govt.: Nuclear fuel recycling policy unchanged

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's newly-appointed industry minister says the central government will continue to promote nuclear fuel recycling.

Motoo Hayashi made the remark on Thursday in a meeting with Aomori Prefecture Governor Shingo Mimura.

The northeastern prefecture hosts the country's first fuel reprocessing plant. But its completion has been postponed many times due to repeated problems during test runs.

Governor Mimura asked Hayashi for the government to promote the fuel recycling policy in a responsible and stable manner.

Mimura also asked the minister not to make his prefecture the final disposal site for the high-level radioactive waste from reactors in the country.

The prefecture has only allowed the reprocessing of spent nuclear fuel.

Hayashi said the government will keep its promise not to build the final disposal site in Aomori. He said the site will be determined by consensus from the Japanese populace at large and the local community involved.

The governor said he values Hayashi's words clarifying the government's fundamental stance. Mimura added that he will continue to closely watch the actions of the government and the plant's operator, so that he can ensure the safety and security of people in the prefecture.

October 28, 2015

Atomic Energy Agency unfit to operate Monju

Nuclear authority says Monju currently inoperable

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's nuclear regulatory body says the country's prototype fast-breeder reactor is currently inoperable due to safety concerns.

The Nuclear Regulation Authority ordered the Japan Atomic Energy Agency 2 years ago not to resume test-runs of its Monju reactor. This followed revelations of a large number of safety oversight issues with the fast-breeder reactor, which is in Fukui Prefecture, central Japan.

The problems with oversight continued even while the reactor was offline. Regulators last week asked senior officials of the education and science ministry to explain how they were supervising Monju's operator.

At a meeting of the regulatory authority on Wednesday, Satoru Tanaka said the Atomic Energy Agency seems to be unfit to operate the Monju. He said the science ministry should appoint a new operator.

The authority's Chairman Shunichi Tanaka said it appears to be impossible to put the Monju into operation, given the safety problems.

Regulators will question the operator's president Toshio Kodama on Monday.

November 4, 2015

Monju: Call for review

Nuclear regulator to call for new Monju reactor operator

http://mainichi.jp/english/english/newsselect/news/20151104p2g00m0dm066000c.html

TOKYO (Kyodo) -- Nuclear regulators decided Wednesday to urge the science minister to pick a new entity to run a trouble-prone prototype fast-breeder reactor within about six months, as they see little progress in safety management operations under the current operator.

The Nuclear Regulation Authority concluded at a meeting open to the public that it is inappropriate to continue having the government-backed Japan Atomic Energy Agency take charge of the Monju reactor in Fukui Prefecture.

The regulatory body will recommend that Hiroshi Hase, the minister of education, culture, sports, science and technology, appoint a new operator to bolster the reactor's safety management in its first such action since it was set up in September 2012 after Japan tightened its nuclear safety policy following the Fukushima disaster in 2011.

The nuclear watchdog will call for the minister to consider how the safety of the reactor can be guaranteed and also a possible option to close it if the minister is not able to find a replacement.

"We had repeatedly asked (the minister's) officials for improvement but we hadn't seen (any major) improvement," NRA Chairman Shunichi Tanaka said at a press conference after the meeting.

The NRA is not in a position to order the operator to shut down the reactor, as that will depend on a decision to be made by the JAEA, he added.

The science minister said the regulators have reached an "extremely serious" conclusion, adding that his ministry "should promptly respond" to the recommendation.

Chief Cabinet Secretary Yoshihide Suga said that the ministry should try to resolve the problems as soon as possible.

The potential closure of the reactor could lead to a drastic review of a nuclear policy the government has pursued for decades, given that the majority of the public remains against nuclear restarts following the Fukushima crisis.

The government has been looking to recycle fuel used at nuclear power plants by reprocessing it into mixed-oxide fuel, to be used again both at fast-breeder reactors -- which are designed to produce more plutonium than they consume -- and at many light-water reactors running in resource-scarce Japan.

The fast-breeder reactor has experienced a series of safety problems over the years following a major fire in 1995 caused by a sodium leak.

The fire led to operations being suspended at the reactor until May 2010. It was halted again in August that year after a fuel replacement device for the reactor was accidentally dropped, leaving it inoperable until now.

The JAEA, the operator, failed to conduct an inspection of a massive number of devices at the reactor in 2012. This was followed by the discovery that dozens of monitoring cameras were broken during a safety inspection last year, as well as a leakage of radioactive liquid waste earlier this year after an alarm was ignored for more than a year.

The NRA's recommendation comes after a meeting with an official in charge of the reactor at the science ministry last month, and also with JAEA President Toshio Kodama on Monday to hear ideas on what steps the organization should take to enhance its safety operations.

Japan's nuclear fuel cycle project may come under review

http://mainichi.jp/english/english/perspectives/news/20151104p2a00m0na016000c.html

The Nuclear Regulation Authority (NRA)'s recommendation that the Japan Atomic Energy Agency (JAEA) be replaced as the operator of the trouble-plagued Monju prototype fast-breeder nuclear reactor could lead to a review of Japan's entire nuclear fuel cycle project, it has been learned.
Japan, which is short of natural resources, has promoted the nuclear fuel cycle project whereby spent nuclear fuel is processed and reused for nuclear reactors as part of its national policy.
The troubled reactor, which is located in Fukui Prefecture, is regarded as the project's core facility. While conventional nuclear reactors use water as a coolant, the Monju reactor instead uses liquid sodium for this purpose -- which easily catches fire if exposed to air. As such, far more advanced technology is required for Monju's maintenance. The JAEA repeatedly violated rules in this regard, however, such as failing to inspect many parts of the reactor's devices, which were exposed in 2012.

Alarmed by these blunders, the NRA exercised its authority for the first time to urge that the JAEA be replaced as the operator of the prototype fast-breeder reactor. According to a high-ranking official with the Ministry of Education, Culture, Sports, Science and Technology, invoking the use of this authority is regarded as a last resort.
The series of misconduct-related incidents is largely attributable to JAEA's failure to stop the outflow of experienced engineers and technicians. Since no nuclear plant operator other than JAEA has experience with managing nuclear reactors that use liquid sodium as coolant, however, it is expected that it will be difficult to find an entity to take over Monju within six months as sought by the NRA. Such being the case, the NRA recommendation could spark calls for a review of the entire nuclear fuel cycle project.
About 1 trillion yen in taxpayers' money has been invested on the Monju reactor. Major countries such as the United States, Britain and Germany have abandoned introducing fast-breeder reactors, while other countries including China and Russia are in the process of developing them.
Japan should take the opportunity of the NRA recommendation, therefore, to hold an in-depth debate on whether to go ahead with its nuclear fuel cycle project -- or to abandon it instead.

Monju: JAEA "unfit for the job"

Nuclear regulator urges new Monju reactor operator to enhance safety

http://www.japantimes.co.jp/news/2015/11/04/national/nuclear-regulator-urges-new-monju-reactor-operator-enhance-safety/

Kyodo
Nuclear regulators decided Wednesday to urge the science minister to pick a new entity to run a trouble-prone prototype fast-breeder reactor, as they see little progress in safety management operations under the current operator.
The Nuclear Regulation Authority (NRA) concluded at a meeting open to the public that it is inappropriate to continue having the government-backed Japan Atomic Energy Agency (JAEA) manage the Monju reactor in Fukui Prefecture.
The regulatory body will recommend that Hiroshi Hase, the minister of education, culture, sports, science and technology, appoint a new operator to bolster the reactor's safety management. It is the first such action by the NRA since it was set up in September 2012 after the nation tightened its nuclear safety policy following the Fukushima disaster in 2011.
The nuclear watchdog will call for the minister to consider how the safety of the reactor can be guaranteed and also a possible option to close it if the minister is not able to find a replacement.

The potential closure of the reactor could lead to a drastic review of the nuclear policy the government has pursued for decades, given that the majority of the public remains against nuclear restarts following the Fukushima crisis.
The government has been looking to recycle fuel used at nuclear power plants by reprocessing it into mixed-oxide fuel, to be used again both at fast-breeder reactors — which are designed to produce more plutonium than they consume — and at many light-water reactors running in resource-scarce Japan.
The fast-breeder reactor has experienced a series of safety problems over the years following a major fire in 1995 caused by a sodium leak.
The JAEA, the current operator, failed to conduct an inspection of a massive number of devices at the reactor in 2012. That was followed by the discovery that dozens of monitoring cameras were broken during a safety inspection last year, as well as the more recent leakage of radioactive liquid waste after ignoring an alarm for more than a year.
The NRA's decision comes after a meeting with an official in charge of the reactor at the science ministry last month, and also with JAEA President Toshio Kodama on Monday to hear ideas on what steps the organization should take to enhance its safety operations.

NRA to call for replacing Monju operator

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's nuclear regulator is set to call on science minister Hirosi Hase to replace the operator of the country's Monju prototype fast breeder reactor.

The Nuclear Regulation Authority made the decision at a meeting on Wednesday, based on its view that the current operator, the Japan Atomic Energy Agency, is unfit for the job. The NRA says the operator of the reactor in Fukui Prefecture has failed to improve its safety.

The authority also plans to ask Hase to fundamentally review the reactor's status and consider scrapping the facility if a new operator cannot be found. It wants the minister to name an alternate operator within about 6 months.

NRA Chairman Shunichi Tanaka said mere reorganization would not solve the operator's problems, due to the agency's repeated misconduct over the past 20 years.

The regulator ordered the agency 2 years ago not to conduct test runs at Monju after many safety oversight problems surfaced. New problems with its safety management were found even after the reactor went offline.

The NRA is authorized by law to offer unbinding recommendations to the heads of government ministries and agencies to ensure safe use of nuclear power.

The authority's decision to issue such a recommendation is its first since it was established 3 years ago.

November 5, 2015

Nuclear fuel cycle in a stalemate

Advisory to replace Monju operator suggests stalemate in nuclear fuel cycle policy

http://mainichi.jp/english/english/perspectives/news/20151105p2a00m0na015000c.html

The Nuclear Regulation Authority (NRA) has decided to advise the science minister to find an alternative operator for the trouble-plagued Monju prototype fast-breeder reactor in Fukui Prefecture, in a first move of its kind by the nuclear watchdog.

The advisory, to be issued to Minister of Education, Culture, Sports, Science and Technology Hiroshi Hase, will also call for a drastic review of the Monju operated by the Japan Atomic Energy Agency (JAEA) in case a new operator cannot be found. The move raises the possibility of a major overhaul of the country's nuclear fuel cycle policy, including the decommissioning of the Monju reactor itself.

In the meantime, if the plutonium used as fuel for the reactor has nowhere to go, the country will be faced with global concerns for its potential diversion of plutonium for use in nuclear weapons, causing an impasse to the country's nuclear energy policy.

"We will respond swiftly in light of the advisory. We take it as an extremely grave judgment," science minister Hase told a press conference on Nov. 4, following the NRA's decision to issue the advisory earlier the same day. However, it is difficult to find a new entity to operate the Monju reactor, which uses sodium coolant and requires highly sophisticated nuclear technology.

"I have no idea who would be the ideal operator (of Monju) as desired by the NRA," said a high-ranking science ministry official in charge of the JAEA on Nov. 5.

The NRA's advisory -- based on the Act for Establishment of the Nuclear Regulation Authority -- is regarded as a "last resort," with which the NRA can call on other ministries and agencies for improvement when the safety of nuclear facilities is not ensured, according to a senior science ministry official. The NRA's predecessor, the Nuclear and Industrial Safety Agency, was not entitled to such an advisory right, and the latest advisory is the first to be issued by the NRA since its inauguration in September 2012.

In explaining the reason for exercising the right to such an advisory, the NRA pointed out that: the JAEA, which cannot perform maintenance on Monju, is not capable of running the reactor; the advisory is aimed at making the science ministry aware of the essential problems it faces with no solution in sight; and the deterioration of equipment and human technology cannot be left untreated, among other reasons.

NRA Chairman Shunichi Tanaka told a Nov. 4 news conference, "We cannot leave it up to the JAEA" to operate the Monju reactor. Regarding the possibility of the reactor's decommissioning, he said, "The science minister (who oversees the Monju operator) will make a decision after deliberating the issue from various viewpoints."

Following the revelation in November 2012 that the JAEA failed to check a large number of devices of the Monju reactor in its inspections, the science ministry has led JAEA's reform by dispatching leading ministry employees to the JAEA and picking its senior officials from the private sector. "The JAEA, which has accumulated research results, is the one to take charge of such a new type of reactor as Monju," the ministry stated.

Masaaki Tanaka, director-general of the science ministry's Research and Development Bureau, who was summoned by the NRA on Oct. 21 this year, emphasized that the JAEA has transformed itself to be able to detect problems on its own. NRA Chairman Tanaka, however, refuted, "The period when the agency just needed to move ahead is over."

In response to the NRA advisory, Hiroki Takaya, director of the science ministry's International Nuclear and Fusion Energy Affairs Division, said on Nov. 4 that the ministry will look into picking a new operator for Monju from scratch without ruling out the possibility of assigning manufacturers,

power companies or even foreign businesses. However, nuclear plant manufacturers and power companies -- which are busy responding to the new safety regulations adopted in the wake of the Fukushima meltdowns -- see no benefit from operating the Monju reactor, whose commercial use is nowhere in sight. "We have no prospects of finding a company that can take on the operation of the reactor," confided a senior science ministry official.
While there is a possibility of setting up a new organization to which JAEA employees in charge of Monju are transferred to take care of the reactor, NRA chief Tanaka warned against such a move, saying, "The efforts (to ensure safety) must be substantial."
The science ministry has no option in mind to get rid of Monju, which is the centerpiece of the country's nuclear fuel cycle policy. The ministry's Research and Development Bureau chief Tanaka said, "We want to resume operations (of Monju) somehow. We have no choice but to concentrate on revamping the maintenance and management system in accordance with the NRA's conditions."

Change of Monju reactor operator could spell end to Japan's nuclear fuel cycle dreams

http://mainichi.jp/english/english/perspectives/news/20151105p2a00m0na011000c.html

The Nuclear Regulation Authority (NRA) decided on Nov. 4 to call for a new operator for the deeply troubled Monju fast breeder reactor -- a move that could signal the end of Japan's decades-long attempt to create a nuclear "fuel cycle" and send shockwaves through the country's long-term energy policy.
NRA Chairman Shunichi Tanaka stated during an Oct. 21 news conference that the authority "won't say that it's all right to take safety issues lightly just because there's an (energy) policy in place," declaring that safety has top priority in any decisions about the Monju Nuclear Power Plant in Tsuruga, Fukui Prefecture. He also said that he was not fixated on continuing a national energy policy premised on the Monju project.
The plant's lone experimental reactor is a "fast-breeder" model that runs on mixed plutonium-uranium "MOX" fuel, and is designed to produce more plutonium -- and thus more fuel material -- than it consumes even as it generates energy. MOX fuel is refined from plutonium and uranium waste produced by conventional reactors, and using it in both regular and the Monju reactors promised to help deal simultaneously with Japan's nuclear waste problem and provide for the resource-poor country's energy needs. The Monju "dream reactor" is, in other words, an essential part of the fuel cycle project, which is in turn a central pillar of the government's long-term national energy strategy.
Despite being out of operation for most of its 20-year life due to accidents and scandals, plans to move ahead with the Monju reactor project have not changed, not even since the triple-meltdown at the No. 1 Fukushima nuclear plant put the future of nuclear power in Japan in doubt. In April 2014, the government added developing technology to reduce highly radioactive waste to the Monju project objectives under the national energy policy. The Monju fast breeder project has already cost Japan more than 1 trillion yen, and has yet to produce any meaningful results, and yet the government looks poised to prolong its life.
With the Nov. 4 NRA recommendation to take the Monju plant out of the hands of the Japan Atomic Energy Agency (JAEA), however, the reactor could eventually be decommissioned. That would effectively end Japan's attempts to make fast breeder reactors a practical technology, and could deal a fatal blow to the fuel cycle policy.
Should the fuel cycle dream come crashing down to earth, Japan's plutonium stores could spark international concerns over nuclear proliferation. Japan already has some 47 metric tons of plutonium tucked away both inside and outside the country -- enough fissile material for several thousand nuclear warheads. Using concentrated plutonium into MOX fuel and plugging it into fast-breeder reactors would be an effective way to deal with the deadly material.

An alternate is the "pluthermal" program, or using MOX fuel in regular reactors. The Federation of Electric Power Companies of Japan had planned to have 16-18 reactors across the country using MOX fuel by fiscal 2015. However, only four reactors were running on the fuel before the outbreak of the Fukushima nuclear disaster, and at present only one -- the No. 3 unit at the Shikoku Electric Power Co.'s Ikata plant in Ehime Prefecture -- looks to have any prospect of doing so.
The international community has never made a great fuss about Japan's enormous plutonium stockpile on the understanding that it would eventually be used in MOX-fuelled reactors like Monju. If the Monju reactor is shut down for good, the justification for this county's plutonium hoard will go with it, potentially sparking global criticism that all this fissile material may end up in bombs. From an international perspective, then, it is difficult indeed -- maybe impossible -- to kill the Monju project.
(By Yui Shuzo, Science & Environment Department)

Nuclear fuel cycle in a stalemate (2)

Editorial: Decommission trouble-plagued Monju fast-breeder reactor

http://mainichi.jp/english/english/perspectives/news/20151105p2a00m0na007000c.html

The Nuclear Regulation Authority (NRA) has decided to recommend that the Japan Atomic Energy Agency (JAEA) be replaced by another entity as the operator of the trouble-plagued Monju prototype fast-breeder nuclear reactor. The NRA is set to issue the recommendation to the education, culture, sports, science and technology minister, the regulator of the JAEA, under the Act for Establishment of the NRA. The authority also intends to fundamentally review the Monju project and even consider the possibility of decommissioning the reactor if the science minister cannot find and name an alternate operator in six months.
Monju situated in Tsuruga, Fukui Prefecture, has hardly been in operation since a sodium leak in 1995. The JAEA and the ministry explored the possibility of the organization's structural reform and reviewed safety measures for the reactor. However, misconduct-related incidents have continued at the JAEA. It is only natural that the NRA has deemed that the operation of Monju should not be left to such an organization.
The government has promoted the so-called nuclear fuel cycle project, in which spent nuclear fuel is reprocessed and plutonium extracted from the fuel is used as fuel for atomic power stations. Fast-breeder reactors are the core of the project. The ministry is poised to retain Monju while seeking to cooperate with the private sector and overseas nuclear energy-related organizations involved in the project.
However, fast-breeder reactors pose challenges in terms of both technology and costs.
The operation and maintenance of the Monju reactor using liquid sodium, which easily catches fire if exposed to the air, as coolant, requires a higher level of skill than conventional nuclear reactors that use water as coolant. At least 1 trillion yen in taxpayers' money has so far been spent on the reactor. The annual maintenance costs for the reactor amount to approximately 20 billion yen. Nevertheless, there are no prospects that fast-breeder reactors can be put into practical use in the foreseeable future. It is also feared that Monju is aging.
These fundamental problems are highly unlikely to be solved simply by replacing the reactor's operator. The government should decommission the prototype fast-breeder reactor.
It came to light in November 2012 that the JAEA failed to inspect about 10,000 parts of Monju, and the NRA responded by instructing the agency to suspend operations at the reactor. However, new misconduct-related incidents surfaced one after another, prompting the NRA to decide to recommend that the JAEA be replaced as the Monju operator.
The recommendation will be issued purely to respond to safety-related problems at a nuclear facility. Still, a review of Monju could lead to debate on the nuclear fuel cycle project as a whole.

There are no prospects for starting operations at a nuclear fuel reprocessing plant that Japan Nuclear Fuel Ltd. is building in the Aomori Prefecture village of Rokkasho. However, the completion of the facility has been repeatedly postponed because of technical problems and safety inspections by the NRA. The construction costs, which had been initially estimated at 760 billion yen, have increased three-fold.
Even if the reprocessing plant is to be put into operation, plutonium to be extracted from spent nuclear fuel would have nowhere to go as long as the development of fast-breeder reactors remains deadlocked. Moreover, progress cannot be made on a project to use plutonium extracted from spent nuclear fuel for conventional nuclear plants.
Since the nuclear fuel cycle project has obviously been deadlocked, the government should immediately begin to seriously consider permanently shutting down the project.

Keeping Monju is like flogging a dead horse

NRA's 'new management' call for Monju reactor proves divisive

http://www.japantimes.co.jp/news/2015/11/05/national/nras-new-management-call-monju-reactor-proves-divisive/#.Vjsv3St1BLM

by Eric Johnston
Staff Writer
OSAKA – Two decades after a sodium leak and fire shut it down and nearly six decades after it was first conceived, the Monju prototype fast-breeder reactor in Tsuruga, Fukui Prefecture, suffered another blow Wednesday when the Nuclear Regulation Authority called for it to be turned over to another operator.
To date, over ¥1 trillion has been poured into Monju — a plant that has never produced commercial electricity. Despite remaining inactive, safety measures alone cost ¥50 million a day.
Anti-nuclear activists have hailed the NRA's unusually critical language as an important step toward scrapping the reactor, which was supposed to burn plutonium mixed with uranium.
Fukui politicians who heavily support Monju, including the prefecture's governor and the mayor of Tsuruga, doubt that another operator can be found. They also worry that scrapping it would create local concerns as well as safety issues.
"What does it mean when the NRA says that it can't leave Monju's operations to the (government-backed) Japan Atomic Energy Agency? There aren't any other organizations it can be left to," Tsuruga Mayor Takanobu Fuchikami told reporters after the decision.
Fukui Gov. Issei Nishikawa also criticized the decision, saying such advice was "lacking in kindness."
"Monju's system should be rebuilt as a research facility, as part of Japan's national strategy," Nishikawa said.
Monju, conceived in the 1950s, has faced nothing but technical trouble, domestic and international controversies, and scandals.
Originally slated to go live in 1970, monju did not reach criticality until 1994. It was shut down following a December 1995 leak and fire involving liquid sodium. The incident was at that time Japan's worst nuclear-related accident.
Further delays and scandals meant that by 2005, when Monju was taken over by JAEA after its predecessor organization was disbanded, officials hoped it would be commercially viable by around 2050.
But after it was revealed in 2012 that JAEA had failed to inspect nearly 10,000 reactor components in and after 2010, the NRA ordered Monju not to engage in preparatory work until it was satisfied safety had been improved.

Despite the technical difficulties and official denials, fears Japan might somehow use Monju to produce nuclear weapons were also heightened after statements from senior Japanese officials, including Prime Minister Shinzo Abe.
In 2002, Abe, while serving as deputy chief Cabinet secretary, said Japan could legally possess nuclear weapons so long as they were small and strategic. That same year, Ichiro Ozawa, then the leader of the Democratic Party of Japan, suggested plutonium at Japanese nuclear power plants made it possible for Japan to produce 3,000 to 4,000 warheads.
Activists are urging the government to give up on the project.
"Monju should be permanently shut down. If the Japanese government is capable of immediately and permanently scrapping Monju, we can gain some trust that it intends to have a logical, functional basic energy policy," said Aileen Mioko Smith, executive director of Kyoto-based anti-nuclear group Green Action. "If it continues the status quo by flogging a horse that has been dead for 20 years, it bodes badly for Japan's energy future."

Govt should pull the plug on Monju program

EDITORIAL: Abe government should finally scrap Monju fast-breeder reactor

http://ajw.asahi.com/article/views/editorial/AJ201511050029

The Nuclear Regulation Authority decided Nov. 4 to recommend that the operator of the trouble-plagued Monju prototype fast-breeder reactor be replaced.
The nuclear safety watchdog will issue a recommendation to science and technology minister Hiroshi Hase to choose a new operator to replace the government-affiliated Japan Atomic Energy Agency, which the NRA says is unfit for the job.
The NRA intends to ask Hase, who oversees the Monju program, to reply to its recommendation within six months. If the minister fails to pick a new organization to manage and operate the reactor, the NRA will call for a fundamental review of the program.
Twenty years after the reactor was hit by a major accident in which a massive leak of sodium from a pipe carrying sodium coolant caused a fire, the safety of the technology has yet to be firmly established.
Although the NRA has left open the possibility of keeping the Monju program alive, it will not be easy to find a new operator of the reactor as the NRA has recommended.
The JAEA took over Monju operations from the Japan Nuclear Cycle Development Institute, which was created in 1998 through a reorganization of Power Reactor and Nuclear Fuel Development Corp.
A simple reorganization of the JAEA will not do, and there is currently no viable candidate to take over its role.
The Abe administration should decide to decommission the reactor.
The government should take seriously the decision by the NRA, an independent watchdog created in 2012 in response to the Fukushima nuclear disaster, to issue its first recommendation based on the view that the current Monju operator is not qualified for the mission.
In May 2013, the JAEA was banned by the NRA from making preparations for a resumption of Monju operations after the agency was found in 2012 to have failed to conduct proper safety checks on about 10,000 pieces of equipment.
In past safety inspections, the JAEA was found to have violated safety regulations on eight occasions.
Given these records, the NRA's decision that the JAEA is not a suitable operator of the technologically challenged reactor is not unexpected.
Unlike ordinary nuclear reactors operated by electric utilities, Monju uses sodium as coolant. Sodium is a volatile chemical because it reacts violently with water.

Theoretically, the Monju fast-breeder reactor can produce more plutonium than the amount of plutonium extracted from spent nuclear fuel through reprocessing and used as its fuel.
But the big problem is that there is no reliable technology to use sodium as a reactor coolant.
If the Monju program is kept alive without a clear vision and plan for the development of practical breeder-reactor technology, its safety will eventually be jeopardized because of a lack of discipline.
In addition to safety concerns, a diminishing need for breeder-reactor technology is undermining the case for continuing the Monju program.
The prices of uranium, the fuel for commercial nuclear reactors, remain stable at low levels. That means developing costly fast-breeder reactor technology does not make economic sense.
Since the 2011 accident at the Fukushima No. 1 nuclear power plant, there has also been slow but steady growth in the domestic production of renewable energy.
The fiscal crunch facing this nation casts further doubt on the wisdom of continuing the operation of the troubled reactor, which costs some 20 billion yen annually for maintenance alone, while both its prospects for future practical use and its economic necessity are highly questionable. Many other industrial nations have already given up developing breeder reactors.
Pulling the plug on the Monju program is the only reasonable option. The decision to do so should be the government's answer to the NRA's recommendation.

November 6, 2015

France fueling nuclear arms race in Asia

How France is Fueling Japan and China's Nuclear 'Race'

http://www.nationalinterest.org/feature/how-france-fueling-japan-china%E2%80%99s-nuclear-race-14271

France is helping to support industrial policies that make no economic sense and potentially threaten a nuclear arms race in Northeast Asia.

by Victor Gilinski and Henry Sokolski

While the world is focused on Iran and nuclear proliferation in the Middle East, an accelerated round of nuclear plutonium production is about to get started in East Asia. **Areva, the French nuclear export firm, is desperate for business, and therefore is seeking to sell a large plutonium separation plant to China. It is simultaneously urging Japan to start commercial operation of its large plutonium recycling complex, despite the unfavorable impact this would have on efforts to rein in worldwide production of nuclear explosives.**

The Japanese newspaper *Asahi Shimbun* recently reported that after an October 5 meeting in Tokyo, "Prime Minister Shinzo Abe and his French counterpart Manuel Valls agreed to help ensure Japan maintains its longtime policy to recycle spent nuclear fuel . . ."

Innocent as this statement may sound, behind it is an effort by nuclear bureaucracies in the two countries to keep alive outdated industrial nuclear policies that make no economic sense and potentially threaten a nuclear arms race in Northeast Asia. **That "longtime" Japanese policy involves producing plutonium, many tons of it, for use as fuel. Plutonium, of course, is also used in**

nuclear weapons, and just a few kilograms suffice for a warhead. Not surprisingly, China and South Korea take a considerable interest in Japan's plutonium policy. Japan's example also threatens the worldwide effort to restrain the spread of nuclear weapons.

Japan is on the verge of operating a large reprocessing plant at Rokkasho that is capable of separating eight tons of plutonium annually from used nuclear fuel. This $20 billion plant was, from the beginning, a triumph of nuclear ideology over economics. The plutonium fuel it was supposed to produce for Japan's power reactors would cost several times as much as the uranium fuel it would displace. After Japan's Fukushima accident and the subsequent closure of its nuclear reactors, only a small fraction of which will return to operation, the Rokkasho plant lost whatever plausibility it had. Japan already owns about thirty-five tons of plutonium separated and stored in France and Britain, and has nearly eleven tons on hand in Japan.
The public awareness of Rokkasho's unwarranted expense and possible weapon applications has put Japan's bureaucratically rigid nuclear establishment on the defensive. **The plant's operation, while still likely, is no longer assured—which is why France is rushing to "help ensure Japan maintains its longtime policy." France has been involved with Rokkasho through the Areva nuclear industrial group**, and is currently negotiating with China to build a similar reprocessing plant there. A Japanese decision not to operate Rokkasho would reverberate throughout the tightly connected nuclear world, and might well cause China to rethink its reprocessing project. This would be a severe blow to **Areva, which is in deep financial trouble. Its latest reactor projects are ballooning in cost and encountering technical difficulties, and its reprocessing business is losing customers. It needs Japan to stick with its "longtime policy."**
There is a larger dimension to the French-Japanese nuclear connection. The nuclear establishments in both countries embraced, early and powerfully, the original nuclear dream of using reprocessed plutonium to fuel a new generation of fast breeder reactors that would then take over the generation of electricity. (These would in principle consume all uranium fuel as opposed to current reactors that only use about one percent of it, and so would be a power source with an essentially infinite supply of fuel.) Both countries built prototype breeders but found a commercial shift to these advanced reactors to be technically and economically unrealistic. But both countries continue to cling to their original aspirations.

The French have also learned that **you don't need economic technology to make lots of money: you just need someone to pay for it. The Japanese played that role over the past few decades.** The nuclear authorities had promised the communities around Japan's power reactors that the radioactive-used fuel would be removed. The French were happy to accept it for reprocessing—for a steep price that included an up-front Japanese contribution to pay for building a French reprocessing plant. **Now, France is urging Japan to waste money on its own plant so that France can gain a profit in China. The trouble is that there is more than money at stake.**

However much Japan reiterates its Nonproliferation Treaty pledge to abjure nuclear weapons, and complies with IAEA inspections, **China worries about Japan's nuclear weapons potential**. If Japan goes forward with the Rokkasho operation when economic arguments are decidedly against it, China's concerns will multiply many times over. **Everyone is aware that if the plant were put to military use, it would be capable of producing more than a thousand bombs' worth of plutonium per year. In these circumstances, international inspections cannot provide a "timely" warning of diversion to military use**. Japan's argument, that plutonium drawn from power reactors is not useful for bombs, conflicts with what weapon scientists say.

In any case, if Rokkasho enters commercial operation then China's reprocessing and fast breeder enthusiasts will likely get the green light from their government for a reprocessing contract with Areva. China's plan is to store plutonium fuel for a fast breeder prototype, but the project would also

give China the option to rapidly increase the size of its nuclear arsenal, a point not lost on some Japanese strategists.

In the wings is South Korea, which has been pressing the United States to allow it to reprocess plutonium in the US-ROK nuclear cooperation agreement. It sees itself as the equal of Japan and will not stand for being left behind. We may well end up with a spiraling commitment to reprocessing and plutonium fuel in Northeast Asia. This would sharply reduce the margin between nuclear energy use and weapons in both Japan and Korea. And it would give respectability to adopting reprocessing in countries around the world with mixed motives.

This is not the first time that French reprocessing threatened proliferation problems. In the 1970s, the U.S. government realized that French sales of reprocessing technology to Pakistan, South Korea and Taiwan had "path to a bomb" written all over them. The American government jumped in forcefully and managed to persuade France to stop all three deals.

The United States insisted at that time that whatever the industrial arguments, international security should come first. President Gerald Ford stated in 1976 that plutonium should not be separated or used as a fuel—by any country—until we are confident "that the world community can effectively overcome the associated risks of proliferation." Surely we have not reached that point.
It is unsurprising that Japan's nuclear establishment cannot easily give up the course it has been on for many decades, and thus appeals for "understanding" of Japan's unique circumstances. But if nonproliferation standards are to work, they have to be common standards, applicable to all. **Japan needs to take into account that going ahead with Rokkasho will likely initiate an East Asian competition in plutonium stockpiling that will be difficult to control. The right decision is to put Rokkasho on hold. And France should reconsider the dangers of making separated plutonium more widely available. It should stop selling reprocessing technology and stop encouraging others to reprocess.**

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November 7, 2015

Time to stop nuclear fuel recycling program

Pugwash scientists demand Japan end troubled nuclear fuel recycling program

http://ajw.asahi.com/article/behind_news/social_affairs/AJ201511070038

Japan has been urged to scrap its nuclear fuel recycling program by a group of influential scholars at the 61st Pugwash Conferences on Science and World Affairs, an international advocates body working for a nuclear weapons-free world.
The paper by the 31-member group, presented to Prime Minister Shinzo Abe, specifically calls on the government to abandon the construction of a nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture, a key facility in its trouble-plagued nuclear fuel recycling program.

Japan should also promptly address its current plutonium stockpile of 48 tons, stated the paper, which was signed by Frank von Hippel, a professor emeritus at Princeton University, and other members who participated in the Pugwash organization's annual conference in Nagasaki that ended Nov. 5.
The stockpile of plutonium, which can be used to make nuclear warheads, is posing a serious threat to the international community's nuclear nonproliferation efforts, the scientists said.
Under the government's plans, the Rokkasho plant will recycle plutonium from spent nuclear fuel generated at nuclear power plants across the nation. But the completion of the plant has been postponed a number of times due to technical problems and by extensive and protracted safety screenings by the Nuclear Regulation Authority.
Von Hippel said a nuclear fuel recycling program is not a feasible option for Japan and is simply a waste of money during a news conference in Tokyo on Nov. 6.
The professor said that Japan instead should use the "dry cask storage" method in which spent fuel that has been cooled in fuel pools is then stored in dry casks in a cool environment for a long time.

November 9, 2015

Japan should reassess the wisdom of nuclear fuel cycle program

Review nuclear fuel cycle program

http://www.japantimes.co.jp/opinion/2015/11/09/editorials/review-nuclear-fuel-cycle-program/#.VkBtjb8R-ot

The decision by nuclear power regulators to call for a change in the operator of Monju, the nation's sole prototype fast-breeder reactor, **not only puts the fate of the trouble-prone project in question but raises serious doubts about the government's decades-old policy of seeking to establish a nuclear fuel cycle**. The government should take the upcoming recommendations from the Nuclear Regulation Authority (NRA) as a cue to rethink the controversial and effectively stalled policy itself.
Monju, on which the government spent ¥1 trillion to build, was once touted as a "dream" reactor that produces more plutonium than it consumes as fuel — a boon for resource-scarce Japan. It was also billed as a key component of the nuclear fuel cycle, in which spent fuel from nuclear power plants is reprocessed into plutonium-uranium mixed oxide (MOX) fuel to be reused at fast-breeder reactors and other types of nuclear reactors.
But the plant in Tsuruga, Fukui Prefecture, has been kept offline for most of the past two decades. After first reaching criticality in 1994 and starting to generate electricity the following year, Monju was shut down in December 1995 due to a sodium coolant leak and fire, and remained idled for more than 14 years until it briefly resumed operation in 2010 — when another accident forced it to be halted again. Subsequent revelations of sloppy safety checkups by its operator, the government-backed Japan Atomic Energy Agency, led the NRA to effectively order a ban on Monju's operations.
Judging that no substantial improvement has since been made in the plant's management, the NRA decided last week that it would shortly recommend to the education and science minister that the JAEA is unfit to run Monju and should be replaced by a new entity to operate the reactor. **Unless a new operator is found within half a year, the NRA reportedly plans to urge the government to fundamentally review Monju's management, including its possible decommissioning**. Although the recommendation is not legally binding, it would effectively be difficult to resume the reactor's operation unless the NRA is convinced by the science minister's response.
Monju's operator has been revamped and reorganized since it was shut down in the wake of the 1995 fire and associated problems, but the plant has primarily been run by officials carried over from the original operator, the Power Reactor and Nuclear Fuel Development Corp., to deal with the special fast-breeder reactor technology — which most other countries have given up on commercializing due

to technical hurdles and the massive costs involved. It is deemed difficult for the government to quickly find a new entity to operate the troubled plant, and the NRA's recommendation may put the survival of the Monju project in doubt.

The troubles that have plagued Monju for most of its life are only part of the problems that confront the government policy to create a nuclear fuel cycle. The completion of a nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture, has been delayed for years due to a series of technical glitches and other problems, and its construction cost has already tripled to around ¥2 trillion.

As the prospect of commercialization of the fast-breeder technology appeared remote given Monju's problems, the government has pushed for the use of MOX fuel — processed overseas and shipped back to Japan — at several light-water reactors at nuclear power plants to promote the use of plutonium extracted from spent fuel. But those plants were shut down along with all the others in the wake of the March 2011 triple meltdowns at Tokyo Electric Power Co.'s Fukushima No. 1 plant.

Since it came to power, the Abe administration has sought to put the idled nuclear reactors back online once they've cleared the NRA's screening under a new set of safety standards, and the government says it will continue to pursue the establishment of the nuclear fuel cycle. However, the restart of idled reactors remains slow amid public safety concerns over nuclear power, and power companies are starting to decommission aging reactors under the new tighter standards.

The government needs to stop and consider whether it makes economic sense to keep up the costly nuclear fuel cycle program that supposedly makes the most of uranium resources if — as Prime Minister Shinzo Abe keeps saying — Japan is going to reduce its reliance on nuclear power "as much as possible" to meet its energy needs. If the Rokkasho plant does go online and starts reprocessing spent fuel from power plants across Japan, the nation may end up with more plutonium in addition to the 44 tons that have already been stockpiled, at a time when many nuclear power plants, including the MOX-capable ones, remain shut down. This situation may raise international concern from the viewpoint of preventing the proliferation of nuclear materials.

The recommendation to review the long-dormant Monju project should give the government, the power industry and the public an opportunity to also reassess the wisdom of pursuing the establishment of a nuclear fuel cycle program.

November 12, 2015

Safety and costs: Keep Monju?

Fate of troubled Monju reactor hangs in balance

http://www.japantimes.co.jp/news/2015/11/12/national/fate-troubled-monju-reactor-hangs-balance/#.VkRV7L8R-os

by Reiji Yoshida
Staff Writer

The fate of the nation's troubled prototype fast-breeder reactor is in the air amid continued questions over its safety and cost. Political challenges to the country's nuclear policy are also taking a toll.

Taro Kono, the anti-nuclear Cabinet minister in charge of administrative reforms, has himself started attacking the Monju project, openly questioning the feasibility of the plant after a high-profile budget review by a team of experts Wednesday in Tokyo.

In a separate move, the Nuclear Regulation Authority was set to lodge a formal request for a change in the plant's ownership. It was to ask the education and science ministry Friday to find a new operator after decades of serious problems that have shaken confidence.

The NRA's recommendation could lead to Monju's closure because it will be hard to find a replacement for the government-backed Japan Atomic Energy Agency (JAEA), observers say.
"This will be (Monju's) last chance to win the trust of the nation," Chief Cabinet Secretary Yoshihide Suga told a news conference Thursday.
Kono, who was appointed as administrative reform minister in the Oct. 7 Cabinet reshuffle, has long been critical of the policy to develop a nuclear fuel cycle.
During the budget review session Wednesday, he criticized JAEA for wasting vast sums of money on maintaining the nuclear-fuel transport ship Kaiei Maru.
The ship, built in 2006, costs about ¥1.2 billion every year to maintain and has been used only four times.
"After all, you can't tell if Monju will actually work or not," Kono said following the session Wednesday.
"We need to examine whether budgets for certain related projects are really effective, such as those for nuclear fuel recycling," he said, according to media reports.
Monju was designed to produce more plutonium fuel than it consumes. Fast-breeder reactors are a central component in the nuclear fuel recycling system the government still is trying to build, despite Monju's lousy record of accidents and decades of idleness. One of the potential threats stems from the massive amount of dangerous sodium it contains as coolant.
In November 2012, it emerged that JAEA had failed to check as many as 10,000 of Monju's components, as required by safety rules.
In May 2013, the NRA ordered JAEA to halt operations pending improvements to the plant's management.
During a Nov. 4 news conference, NRA Chairman Shunichi Tanaka said the agency had yet to see significant improvement in JAEA's management of the plant, and as a result it wanted the agency fired.
The education ministry will have six months to show how it will respond to the NRA's request.
"Exactly 20 years ago, Monju had an accident involving a sodium leak. Ever since then, numerous measures have been taken to fix problems, but they haven't been corrected yet," Tanaka said.
Tanaka said the NRA had the legal power to retract its "construction permission" for Monju, which would force the government to close the prototype reactor immediately.
But the NRA was not thinking of the option "at this stage," Tanaka quickly added.
He said the NRA was questioning only Monju's safety, not the government's nuclear recycling policy as a whole.
On Thursday, a high-ranking government official admitted the Monju project had drawn much public attention, saying the government should "provide an explanation that can be understood by every party."
The official said JAEA had enjoyed such unqualified support from the government's nuclear policy that it had been indulged a stretch too far.
"JAEA has become spoiled," the official said.

Fukui asks for full govt. commitment to Monju

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The governor of Fukui Prefecture has urged the government to take the initiative in addressing safety management issues at the trouble-prone prototype fast-breeder reactor Monju. The prefecture, in central Japan, hosts the reactor.

Monju was developed for the recycling of spent nuclear fuels building up at other reactors in Japan, but due to various safety problems its operator has been banned from conducting a test-run.

Fukui Governor Issei Nishikawa met industry minister Motoo Hayashi on Thursday.

The meeting came after the country's regulator last week judged the operator of Monju, the Japan Atomic Energy Agency, unfit to run the facility, citing its lax safety management.

The regulator plans to recommend the education minister, who oversees the project, to pick a new operator.

The governor said Monju is a pillar of Japan's nuclear fuel recycling plan and the government must be responsible for solving the issue.

He told Hayashi Cabinet members related to Japan's fuel recycling project should set up a system to take responsibility for the plant or otherwise safety problems would recur.

The industry minister replied the education minister will lead discussions on how to address the Monju issue. But he stressed the government will stick to the fuel recycling plan with the understanding of local authorities concerned, as well as from the international community.

November 13, 2015

Monju: NRA getting serious

Clock starts ticking on Monju, advising operator be replaced

http://www.japantimes.co.jp/news/2015/11/13/national/science-health/nra-starts-clock-ticking-monju-advising-operator-replaced/#.VkXR1L8R-ot

by Kazuaki Nagata and Reiji Yoshida
Staff Writer
The Nuclear Regulation Authority on Friday asked the science minister to find a new operator to manage Monju, the troubled prototype fast-breeder reactor that is the centerpiece of the nation's nuclear fuel cycle program.
The NRA said it lacks confidence that the semi-public Japan Atomic Energy Agency can continue running the costly and accident-prone facility in Fukui Prefecture.
Although the request is nonbinding, the NRA said the Education, Culture, Sports, Science and Technology Ministry, which oversees the Monju project, has about six months to look for a new operator and report back. If it fails to find one, the ministry should "fundamentally review" what to do with the reactor.
NRA Chairman Shunichi Tanaka did not comment on whether this means Monju will be decommissioned. He said it is too early to say.
But he said the recommendation has "significant meaning" because it is the first since issued by the NRA since its creation in 2012.
Tanaka was speaking after talks with science minister Hiroshi Hase in Tokyo on Friday.
If the ministry fails to find a new operator that meets the NRA's approval, Monju, which has cost taxpayers more than ¥1 trillion, may face decommissioning.
Later in the day, Chief Cabinet Secretary Yoshihide Suga said the government "should take the recommendation from the NRA very gravely," considering the slew of problems it has faced.

“We’d likely to respond sincerely,” Suga said.
But the government will maintain its policy of establishing a nuclear fuel recycling system regardless of Monju’s fate, Suga added.
“There is no change in our policy to promote (the nuclear fuel cycle), as decided in the Basic Energy Plan,” Suga said. The plan was adopted in April last year.
Hase said the ministry understands the gravity of the situation and will take action.
Fast-breeder reactors such as Monju use sodium as coolant and are designed to recycle nuclear fuel into another power source. Japan lacks significant energy sources of its own.
However, the Monju reactor has only briefly entered operation. It has been idle since a fire triggered by a vast sodium leak in 1995.
In 2012, it was found that JAEA had failed to inspect nearly 10,000 devices at the reactor despite being required to do so. Subsequently, dozens of monitoring cameras were found not to be functioning, and inspectors found a significant leak of radioactive liquid because an alarm had been ignored for more than a year.
In May 2013, the NRA ordered the suspension of Monju’s operation until the establishment of a system to prevent further safety slips.
JAEA President Toshio Kodama met NRA members earlier this month and vowed to improve the situation. the agency’s move Friday was an apparent sign that it has had enough — and an admission that despite repeated warnings the ministry has failed to come up to scratch.
Information from Kyodo added

NRA recommends replacing Monju operator

http://www3.nhk.or.jp/nhkworld/english/news/20151113_29.html

Japan's nuclear regulator has called on the science minister to replace the operator of an experimental reactor in the country.

Nuclear Regulation Authority officials made the recommendation on Friday. They say a new operator for the Monju prototype fast breeder reactor should be found within about 6 months.

The move came after the NRA decided that the current operator, the Japan Atomic Energy Agency, is unfit for the job. The NRA says the operator has failed to improve the reactor's safety.

The NRA offers non-binding recommendations to the heads of government ministries and agencies to encourage the safe use of nuclear power.

NRA Chairman Shunichi Tanaka described the measure as grave, and said it was the first time the authority had taken such action.

He said the recommendation isn't binding, but he would like the science minister to take appropriate action.

Science Minister Hirosi Hase said he thinks the recommendation should be discussed with the relevant ministries and agencies.

The NRA ordered the operator 2 years ago not to conduct test runs at Monju, after many safety

oversight problems surfaced. More problems with its safety management were later found after the reactor went offline.

Time to scrap Monju's "financial folly"

EDITORIAL: Scrap Monju reactor project and use money to develop renewable energies

http://ajw.asahi.com/article/views/editorial/AJ201511130034

The annual public review of policy programs by the government to identify wasteful spending ends on Nov. 13. For three days, the government's administrative reform promotion council has been scouring the budgets of ministries and agencies for savings.

The focus of the budget review this year is the Monju prototype fast-breeder reactor.

The Nuclear Regulation Authority recently recommended that the operator of the troubled-plagued experimental reactor, the government-affiliated Japan Atomic Energy Agency, should be replaced.

Certain expenditures related to the Monju project, mainly state subsidies, were examined in the public review. But the council should take this opportunity to scrutinize all aspects of the controversial project instead of evaluating only the subsidies. We are keen to see the panel demonstrate that continuing the project doesn't make sense and the reactor should be decommissioned from the viewpoint of administrative reforms.

It is already clear that the Monju project is a financial folly.

The construction cost, which was originally estimated at 35 billion yen ($285 million) when the project was in an early planning stage in the 1970s, has ballooned to 1 trillion yen. Although the reactor has been offline for more than 20 years due to a series of accidents and scandals, 20 billion yen is still spent annually, or 50 million yen a day, for maintenance.

The maintenance costs of the reactor under the initial budget for the current fiscal year are almost equivalent to the amount (23.8 billion yen) being shelled out to promote renewable energy projects for local power production and consumption.

The outlays for the Monju project are far larger than the spending on a demonstration project to build a transmission network for wind power generation (10.5 billion yen) or the appropriation to support research for the development of geothermal power sources (8 billion yen).

Following the 2011 Fukushima nuclear disaster, Japan widened the scope of its energy policy to make greater efforts to develop and promote alternative power sources, including renewable energy.

Instead of spending a huge amount of taxpayer money to keep Monju alive, the government should use the cash to build a new, cleaner energy future for this nation.

Japan is facing a serious fiscal crunch. The government is drowning in a sea of debt as its welfare spending is surging amid the rapid aging of the nation's population.

The government has no choice but to raise taxes while cutting its expenditures on social security, education and other programs. It cannot afford the luxury of pouring a hefty sum of money into a questionable nuclear reactor with no prospects for practical operation.

The Monju project has survived for so long despite its troubled history because nobody loses money when the reactor is out of operation.

When a reactor operated by an electric utility is shut down because of an accident or a scandal, the company will immediately face a rise in costs that hurts its financial standing.

In contrast, Monju is treated as a research reactor, and the national program gets funded almost automatically.

Both the industry ministry and the science and technology ministry, which are in charge of the nuclear power policy, have a clear interest in supporting the continuation of the Monju project.

If this project is terminated, these ministries will be forced to make a sweeping review of the entire nuclear fuel recycling program and tackle the formidable challenge of disposing of plutonium extracted from spent nuclear fuel.
This year's public budget review is led by Taro Kono, the newly appointed minister in charge of administrative reform who has been a champion of the cause.
We urge Kono to make the decision to scrap the Monju project as a step to press ahead with meaningful administrative reforms.
There is definitely no reason for approving annual spending of 20 billion yen as the cost of postponing this decision.

November 14, 2015

NRA's recommendation on Monju: What impact?

NRA's Monju reactor recommendation could deal serious blow to nuclear fuel cycle

http://mainichi.jp/english/english/newsselect/news/20151114p2a00m0na007000c.html

The Nuclear Regulation Authority (NRA) officially recommended on Nov. 13 that the troubled Monju fast breeder test reactor be taken out of the hands of the Japan Atomic Energy Agency (JAEA) -- a move that could deal a serious blow to Japan's decades-long "nuclear fuel cycle" policy.
The Ministry of Science, Culture, Sports, Science and Technology -- the JAEA's regulator -- will consider a new organization to operate the Monju facility possibly with the cooperation of utilities and foreign nuclear power companies. However, the range of candidates the science ministry could call on is severely limited in terms of technological prowess and overall capabilities. If the ministry cannot designate a new operator by the May 2016 deadline for responding to the NRA recommendations, it will be forced to consider more radical options, including decommissioning the Monju reactor.
The Monju reactor in Fukui Prefecture was built to run on MOX fuel -- a mix of plutonium and uranium processed from spent conventional nuclear fuel -- and produce yet more plutonium that could be made into yet more fuel. MOX fuel can also be put into conventional reactors, but the Monju project held the promise of creating a fuel loop and help resource-poor Japan become energy self-sufficient. The Monju plant, however, has spent the vast majority of its life shut down due to a string of accidents including a fire -- mishaps that played a major role in the NRA's recommendation to find a new operator for the facility.
After receiving the recommendation from NRA Chairman Shunichi Tanaka, science minister Hiroshi Hase said, "I want to get (Tanaka's) advice and guidance on how to proceed from here on" regarding putting together a new organization to operate the Monju plant. Tanaka, however, later commented at a news conference, "I've presented our recommendation, so I cannot also provide the answer," indicating he has no intention of participating in discussions on finding a new operator.
The JAEA has survived serious scandals and mishaps twice before by changing its name, but Tanaka explained that such a tactic wouldn't work this time around, saying, "It clearly states in the recommendation that a different organization" should take over the Monju project.
Of essential importance to the science ministry's search for a new operator is whether the candidate organization has the technology to handle liquid sodium. The substance is used in the Monju reactor as a coolant, but is also explosive if it comes into contact with air or water. The only domestic body that has any experience handling liquid sodium is the JAEA, so the science ministry plans to consider cooperating with foreign nuclear power companies on the Monju project.

Overseas candidates, however, are also hard to come by, as the United States, Britain and Germany have all given up on fast breeder reactors. Research advances into the technology were made in the 1950s and '60s in Europe and North America, but the volatility of liquid sodium proved a very serious roadblock, and many fast breeder projects had been suspended or cancelled by the 1990s.
Currently, only three countries are pursuing fast breeder reactor research seriously: Russia, China and India. Due to defense and nuclear security concerns, however, it looks very unlikely that Japan will be able to partner with any of these nations. Even the NRA's Tanaka said at the Nov. 13 news conference, "I can't determine that no organization (would take over the reactor). Very little research (on fast breeder reactors) is being done anywhere in the world and, personally, I will forgo a personal evaluation of the matter."

Monju: What next?

NRA seeks new operator for Monju reactor; decommissioning likely

http://ajw.asahi.com/article/behind_news/social_affairs/AJ201511140031

Japan's nuclear regulator told the science ministry to find a new operator for the problem-plagued Monju prototype fast-breeder reactor in Fukui Prefecture, or face the possibility of the facility being decommissioned.
Finding a new operator could prove immensely difficult as the prototype reactor has been inoperative most of the time since construction was completed in 1991.
Once heralded as offering a dream energy source, fast-breeder technology is no longer being pursued by many advanced economies.
Monju has become a huge drain on public funds, gobbling up 1 trillion yen (8.33 billion) to date.
In issuing its recommendation Nov. 13, the Nuclear Regulation Authority called on Hiroshi Hase, the minister of education, culture, sports, science and technology, to remove the government-affiliated Japan Atomic Energy Agency as Monju operator.
The science ministry was given about six months to find a new operator. If none is found, the NRA suggested that a comprehensive review be conducted on Monju's status.
Hase was handed the recommendation directly from NRA Chairman Shunichi Tanaka, who said, "I do not believe it will be an easy task to designate a specific new body to replace (JAEA)."
The NRA recommendation laid out the history behind the JAEA and its predecessor bodies being forced to repeatedly come up with new ideas to deal with the mass of problems that beset Monju.
The recommendation said, "It has gone beyond the stage where individual corrections are all that are needed."
It also concluded that the JAEA "did not have the capability to operate (Monju) safely."
The recommendation was the first such issued by the NRA since its establishment in 2012 following the triple meltdown at the Fukushima No. 1 nuclear power plant triggered by the 2011 earthquake and tsunami disaster.
The recommendation said that appropriate measures were needed as soon as possible, given the NRA's concerns about securing Monju's safety.
Factors cited were that it is similar to a small nuclear power plant and uses as a coolant sodium that triggers a violent reaction with water as well as the aging of the facilities and the possibility of a decline in the technological skills to deal with the reactor.
Hase signaled he would move quickly to try to find a new operator for the Monju.
"This contains an issue pertaining to a basic policy of Japan so I intend to deal with the matter by coordinating with the other relevant agencies," Hase said.
Monju was at one time considered the central element of the government's program to recycle spent nuclear fuel. However, the repeated failures it encountered led to a switch in the government's nuclear

program to one using a mixed-oxide fuel that mixes uranium with plutonium extracted from spent nuclear fuel.
Finding a new operator will be anything but easy. For one thing, the JAEA is the only organization with any experience of operating a fast-breeder reactor.
Perhaps the only option would be electric power companies or manufacturing companies that were involved in technological development with the Monju project. However, the business risks would be huge for any company taking on the task.
A former high-ranking JAEA official noted that electric power companies "have their hands full with resuming operations at nuclear power plants or dealing with the issue of extending the operating life of nuclear plants beyond the 40-year limit. It is difficult to think of any replacement operator."
NRA's Tanaka also said that an organizational shakeup at JAEA would not be sufficient to fulfill his agency's recommendations.
The move by the nuclear watchdog body stemmed from the discovery in 2012 that the JAEA failed to conduct proper safety checks on about 10,000 pieces of equipment at Monju. Even after the JAEA received an order from the NRA banning it from preparing for resumption of operations, new cases of lack of oversight came to light.
The NRA recommendation is not legally binding. However, it indicated it would take harsher measures in the future, such as revoking Monju's approval of installment, if the recommendation was ignored.
Toshio Kodama, JAEA president, issued a statement on Nov. 13 which said: "It is the responsibility of the JAEA to produce results through Monju. We will put every effort into a thorough improvement in order to fulfill our responsibility."

November 23, 2015

Once "dream reactor" Monju at a crossroads

Fate of troubled Monju reactor hangs in the balance

http://www.japantimes.co.jp/news/2015/11/23/reference/fate-of-troubled-monju-reactor-hangs-in-the-balance/#.VlNQ7r8R-ot

by Mizuho Aoki
Staff Writer
After decades of repeated troubles, the Monju prototype fast-breeder reactor is at a crossroads.
Earlier this month, the Nuclear Regulation Authority lodged its first official request with the education and science ministry to find a new entity to replace the government-backed Japan Atomic Energy Agency (JAEA) to operate the trouble-plagued facility in Tsuruga, Fukui Prefecture.
The ministry has been given about six months to find a replacement. If it fails to do so, the NRA asked the ministry to conduct a fundamental rethink of Monju's status, which, pundits say, could lead to its decommissioning.
Following are questions and answers about the accident-prone research facility that was completed in April 1991 but has remained, except for brief operational interludes, effectively idled since then.
What is Monju?
It is Japan's sole prototype fast-breeder reactor, designed to produce more plutonium fuel than it consumes to generate electricity.
Once touted as a "dream reactor," Monju is the central component of the country's nuclear fuel cycle program aimed at resolving the nation's shortage of natural energy sources.
The plan has been to extract plutonium and uranium from spent nuclear fuel and reprocess them into plutonium-uranium mixed oxide (MOX) fuel to be reused at the fast-breeder and other nuclear

reactors. Had Monju worked according to plan, it was assumed Japan would no longer need to import uranium.
Monju reached criticality in April 1994 and began generating electricity for the first time the following year. However, it was forced to shut down in December 1995, following a sodium coolant leak and fire, and subsequent cover-up attempt.

Did it resume operation after the 1995 accident?
The reactor went online again in May 2010 for the first time in about 14 years. But just three months later, in August, it was again forced to shut down after a fuel-loading device fell into the reactor vessel. Monju has been idle since then. Other troubles include JAEA's failure in 2012 to inspect some 10,000 reactor components, including more than 50 parts vital for the reactor's safety. This prompted the NRA in 2013 to issue an effective ban on restarting the reactor.
Due to a spate of accidents and JAEA's apparent slipshod safety management, Monju has operated for just 250 days since it reached criticality in 1994.
Still, more than ¥1 trillion in taxpayers' money has been poured into the facility. Reports say about ¥20 billion in funding is required annually to maintain Monju even when it is offline.
Earlier this month, Taro Kono, an anti-nuclear Cabinet minister in charge of administrative reforms, criticized the JAEA for wasting money on nuclear fuel transport ship Kaiei Maru, which has been used only four times since its introduction in 2006 but costs about ¥1.2 billion annually to maintain.

Why has Monju been prone to accidents?
Unlike ordinary nuclear reactors that use water as a coolant, the fast-breeder reactor uses sodium, which reacts violently with water.
Experts say Monju's past accidents were partly due to the difficulty in handling sodium.

Will the science ministry be able to find a replacement for the JAEA?
It would be extremely difficult, experts say.
The key to operating the facility is whether a candidate has the skill and experience to handle sodium.
Hideyuki Ban, co-director of the Tokyo-based Citizens' Nuclear Information Center, said companies that have been involved in Monju's construction or operations, including Mitsubishi Heavy Industries Ltd. and the Japan Atomic Power Company, could be possible candidates.
But those companies' knowledge and ability to handle sodium or Monju itself do not exceed that of the JAEA, he said.
"Although it has struggled, . . . (in the end the JAEA) has continued to run the facility up until now," Ban said. "I believe there is no entity that has deeper knowledge (about Monju) than the JAEA."

What would happen if the government scrapped the Monju project?
What the government fears most is that it could have a huge impact on the nuclear fuel cycle goals Japan has pursued since the 1950s.
"There is no change in the government's policy to pursue (the nuclear fuel cycle) by gaining (the acceptance of) municipalities and the international community," Chief Cabinet Secretary Yoshihide Suga said on Nov. 13.
Some 17,000 tons of spent fuel rods are stored at nuclear power plants across Japan, waiting to be reprocessed to extract plutonium. If the Monju project is scrapped, they may end up as dangerous waste with nowhere to go.
Experts say that because the government plans to restart reactors nationwide, the storage pools will become full of spent fuel rods. Thus it is widely believed that the government will continue to pursue the use of reprocessed fuel in ordinary light-water reactors even if the fast-breeder reactor project is discontinued.

How much plutonium does Japan possess?
As of December 2014, Japan had about 47.8 tons of plutonium, according to the Cabinet Office.

This includes about 10.8 tons in Japan and 37 tons that have been reprocessed and stored in the U.K. and France, waiting to be returned to Japan to be used as fuel.
NHK reported the amount is enough to make about 5,900 atomic bombs.

Are there any countries other than Japan pushing to develop fast-breeder reactors?
Russia, China and India are still eagerly pushing to develop fast-breeder reactors, but none has established the technologies to operate the reactors.
Many industrialized countries, including the U.K. and Germany, gave up development of the reactors a while ago, given the technical and cost hurdles.

November 25, 2015

NRA satisfied with prevention measures at Monju

NRA approves accident prevention steps at Monju

http://www3.nhk.or.jp/nhkworld/english/news/20151125_31.html

Japan's nuclear regulator has approved accident prevention measures presented by the operator of the Monju prototype fast breeder reactor.

During a safety check in July, a crane dropped a steel cover for an emergency power generator. The generator would be crucial in an emergency at the plant.

The operator, the Japan Atomic Energy Agency, presented a report on ways to prevent similar accidents to the Nuclear Regulation Authority.

The report said the crane procedures were insufficient. It said the agency will provide thorough training to workers.

The Nuclear Regulation Authority approved the report on Wednesday. The authority will confirm next month that the steps are actually implemented.

NRA Chairman Shunichi Tanaka said workers always take care when operating a crane. He said it seems workers at Monju lack attentiveness.

Earlier this month, the NRA recommended the Science and Technology Minister find a different entity to operate Monju within about 6 months. The ministry is considering how to respond the recommendation.

November 28, 2015

Govt. will pursue policy of nuclear fuel recycling

Minister: Govt. continues nuclear fuel recycling

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's industry minister Motoo Hayashi says the government will continue to pursue its policy of recycling nuclear fuel.

He spoke to reporters after visiting a nuclear fuel reprocessing plant in Rokkasho Village in Aomori Prefecture, northeastern Japan, on Saturday. It was his first visit to the plant since taking office in October.

The facility is a pillar of the government's fuel recycling program. It has suffered a series of problems during test runs. It remains unclear when the plant will start operating.

Observers fear that fuel storage pools at nuclear plants nationwide may become full if more reactors are restarted while the Rokkasho plant remains offline.

Hayashi inspected a central control center and other rooms at the plant. Officials of its operator, Japan Nuclear Fuel Limited, briefed him about the reprocessing system and equipment as well as the prospect for the plant's completion.

The schedule of the plant's completion has been postponed by more than 2 years because the Nuclear Regulation Authority has not yet finished its safety screening.

Hayashi told reporters that the postponement will allow the plant to meet new safety requirements introduced after the 2011 Fukushima nuclear accident.

The minister added that he asked the operator to make an all-out effort toward the plant's completion.

Japan eyes greater government role in nuclear fuel recycling

http://www.japantimes.co.jp/news/2015/11/28/national/japan-eyes-greater-government-role-in-nuclear-fuel-recycling/#.VlncTL8R-ot

JIJI

The industry ministry has mapped out revisions for the spent nuclear fuel recycling program that call for **stronger government involvement to ensure stable management of the troubled program**, it was learned Saturday.

According to the outline, a new organization sanctioned and supervised by the government will entrust the reprocessing of spent nuclear fuel to Japan Nuclear Fuel Ltd., which is owned jointly by electric power companies.

The government deemed it necessary that it get more involved in the program as a precautionary measure against possible management difficulties at major power companies when the electricity retail market is fully liberalized in April 2016, sources said.

The Ministry of Economy, Trade and Industry will hold a panel meeting with experts on Monday where the revisions will be discussed. Based on the discussions, the ministry hopes to submit amendments on related laws to an ordinary session of the Diet next year, the sources said.

Currently, power companies that operate nuclear plants set aside funds for spent fuel reprocessing, which they will tap to make payments to JNFL, based in the village of Rokkasho, Aomori Prefecture.

The revision outline calls for making it mandatory for the power companies to contribute reprocessing funds to the government-authorized organization in accordance with the amount of electricity generated at their nuclear facilities.

The funds will also be used to operate a uranium-plutonium mixed oxide, or MOX, fuel plant JNFL is constructing to process plutonium extracted from spent nuclear fuel.

The switchover to the revised system is designed so that reprocessing funds can still be collected even if power companies go bankrupt amid intensified market competition after the liberalization of the market goes into effect.

With the nuclear fuel reprocessing and recycling program being led by **the new organization, which cannot be disbanded without government authorization**, power companies will not be allowed to pull out of the program at their own discretion.
The nuclear fuel recycling program is estimated to cost a total of ¥12.6 trillion and power companies have so far set aside ¥5.1 trillion.
But the completion of the fuel reprocessing plant, which will play a central role in the program, has been delayed until the first half of fiscal 2018, after more than 20 postponements from the initially planned date in 1997.
Still, the industry ministry believes the recycling program is essential.
"A nuclear fuel cycle is very important for Japan, which faces a scarcity of natural resources," a senior official said.
There is persistent skepticism, however, about the profitability of the project.

November 30, 2015

Nuclear fuel recycling and Govt involvement

Panel seeks new body to expand government role in nuclear fuel reprocessing

http://www.japantimes.co.jp/news/2015/11/30/national/panel-seeks-new-body-to-expand-government-role-in-nuclear-fuel-reprocessing/#.Vlxvr78R-ot

Kyodo
A panel at the Ministry of Economy, Trade and Industry decided Monday to propose creating a new body to strengthen the government's involvement in nuclear fuel reprocessing operations.
The panel, a fuel-recycling study group, suggested that the new entity should consign reprocessing operations at a facility in northern Japan to the current plant operator, Japan Nuclear Fuel Ltd., which is designed to play a key role in Japan's fuel recycling policy.
The government will finalize the plan after hearing public comments and seek to submit a bill to revise related laws to the Diet next year.
The launch of the spent fuel reprocessing plant in Rokkasho, Aomori Prefecture, has been postponed 23 times since Japan Nuclear Fuel, which was set up by nine regional power producers and others, started building it in 1993, due to a series of problems, including leakage of high-level radioactive waste liquid.
Under the framework proposed by the panel, utilities would also be mandated to make financial contributions to the new entity to shoulder the reprocessing costs and help maintain its financial strength to continue reprocessing regardless of the utilities' business conditions.
At present, power companies set aside reserves to be used for reprocessing, but such reserves could become unusable if the utilities go bankrupt.
The deregulation of the retail electricity market beginning in April is likely to spark fierce competition among power producers, which may decrease their earnings.
Under national policy, fuel used in nuclear power plants is to be recycled by reprocessing it into mixed-oxide fuel, to be used again both in fast-breeder reactors — which are designed to produce more plutonium than they consume — and at many other reactors.
After all reactors were shuttered following the 2011 Fukushima disaster, two units resumed operations this year, and the government aims to generate at least 20 percent of the nation's overall electricity with nuclear power in 2030 to cut greenhouse gas emissions and lower fuel costs.

The latest reorganization plan for reprocessing operations comes also as the outlook for the government's nuclear policy has dimmed further after the nuclear regulatory body recently urged the government to pick a new operator to run the troubled Monju prototype fast-breeder reactor.

More govt. involvement in fuel recycle called

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

A Japanese government panel has called for setting up a new body for the country's recycling program of nuclear fuel, including plutonium. This would increase government involvement.

Fuel recycling in Japan is currently run by the Japan Nuclear Fuel Limited. The JNFL is a private corporation funded by nuclear power companies across the nation.

The proposal from the industry ministry's panel comes as the utilities are set to face harsh competition. Full liberalization of the country's electricity market is scheduled for April next year.

Concerns have been rising that power companies may withdraw from the JNFL's fuel recycling business if they confront financial difficulties.

JNFL's current "limited company" system gives stockholders the choice to withdraw.

The experts' panel has been discussing ways to ensure stable management of the fuel recycling firm. On Monday, it proposed creating a government-authorized corporation that replaces JNFL. The proposed corporation will require government approval to disband.

The panel recommends that the new body continues to utilize JNFL's employees and facilities.

The industry ministry says it plans to proceed with the proposal and prepare necessary bills after soliciting broader opinions.

December 2, 2015

Science minister at Monju

Science minister inspects troubled Monju nuclear reactor

http://www.japantimes.co.jp/news/2015/12/02/national/science-minister-inspects-troubled-monju-nuclear-reactor/#.Vl8iE78R-ot

JIJI
TSURUGA, FUKUI PREF. – Science and technology minister Hiroshi Hase inspected the Monju prototype fast-breeder nuclear reactor on Wednesday after nuclear regulators last month asked his ministry to change the facility's operator following a series of safety lapses.
Ahead of the visit to the reactor, operated by the Japan Atomic Energy Agency in Tsuruga, Fukui Prefecture, Hase held talks with Fukui Gov. Issei Nishikawa at the prefectural government office in the city of Fukui. Hase also met with Tsuruga Mayor Takanobu Fuchikami.

During his visit to the Monju reactor, Hase received a briefing from JAEA President Toshio Kodama and Kazumi Aoto, who is in charge of the plant.
The minister inspected the reactor, which is still filled with uranium-plutonium mixed oxide (MOX) fuel despite being idle since 2010, and watched staff work in the central control room.
Hase asked whether a crane he could see was ever used, to which Aoto answered that it was used to move equipment and regularly received safety checks, according to JAEA officials.
During their meeting in the Tsuruga city government office, Fuchikami handed the minister written requests on five items, including promoting understanding of nuclear power.
Hase responded by saying the ministry would consider it.
Asked by reporters about the safety lapses at the reactor, Hase said he felt there may have been lack of communication between those who worked at the plant and the Nuclear Regulation Authority.
Referring to the NRA's request to change the operator of the Monju reactor, Hase said discussions involving experts was needed.
During his meeting with Fukui Gov. Nishikawa, Hase said he also planned to hear feedback on the matter from local governments.
In November, the NRA concluded that the JAEA lacked the ability to operate the Monju reactor safely.
It asked the ministry, which oversees the reactor, to respond to its request within six months.

December 8, 2015

Yes, what about Monju?

Monju at crossroads 20 yrs. after sodium leak

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's Monju prototype fast-breeder reactor is at a crossroads as it marks 20 years on Tuesday since an accidental leak of sodium coolant. The reactor has since remained mostly idle.

Monju in Fukui, central Japan, was designed to produce more nuclear fuel than it consumes. It was once considered a "dream reactor" for a resource-scarce nation.

But on December 8th, 1995, sodium used as a coolant leaked from the reactor's piping, causing a fire at the facility.

It was later revealed that some video footage of the leak had been hidden to cover up the extent of the accident. Public perception of the reactor worsened.

In 2012, operator Japan Atomic Energy Agency was found to have failed to conduct inspections on about 10,000 items at the plant. Since then, the agency has been repeatedly criticized for insufficient safety management. It is the third operator to run Monju.

Japan's nuclear regulator asked the science minister last month to appoint a new entity within about 6 months to run the troubled reactor.

The regulator said corporate culture at the Japan Atomic Energy Agency hasn't changed from 20 years ago, and the agency is not qualified to operate the reactor.

The ministry plans to set up a panel to discuss requirements for the new operator. But if it cannot find one, the Monju reactor may have to be scrapped.

More than 8 billion dollars has been spent to create and maintain Monju, which has remained offline for most of its lifespan.

Unused plutonium deteriorating at Monju

Monju reactor fuel deteriorating as reactor sits unused

http://mainichi.jp/english/articles/20151208/p2a/00m/0na/004000c

Plutonium fuel at the Monju fast-breeder reactor in Tsuruga, Fukui Prefecture, is deteriorating as the reactor sits unused, it has been learned from the facility's manager, the Japan Atomic Energy Agency (JAEA).
Over the 20 years since a sodium leak on Dec. 8, 1995, the reactor has barely been run, and part of its plutonium has converted to americium-241, which is difficult to break down in nuclear reactions. The agency says that currently the changed fuel does not present an obstacle to running the reactor, but if the reactor remains shut down it may have to prepare new fuel.
The Monju reactor breaks down nuclear fuel like plutonium to make electricity. Neutrons leave the broken-down plutonium, colliding with other plutonium and breaking it down, too. The continuation of this chain reaction keeps the nuclear reactions going.
However, americium absorbs neutrons and puts a brake on nuclear fission. Hideyuki Ban, co-leader of the Citizens' Nuclear Information Center, says, "If you have a growth in the amount of non-nuclear reacting americium in your fuel, then you can call that deteriorated fuel."
When the agency briefly restarted the reactor in 2010, it switched 117 of 198 fuel units for new ones due to parts of them having converted to americium. The agency says that an investigation at the time found that over 1 percent of the total weight of the reactor's fuel had changed into americium.
An agency representative says, "We believe we can currently run the reactor at full capacity." The representative also admits, though, "If the current shutdown of the reactor continues long-term (and the amount of americium grows), we will have to change some fuel for new fuel."
Construction work on the Monju reactor began in 1985, and in 1995 it began producing and sending electricity. However, after a sodium leak it was shut down. It was finally restarted in May 2010, but in August that year a fuel-exchanging device fell in the reactor, and the reactor was shut down again.
Even while offline, it costs around 22.3 billion yen a year to maintain it. The total amount spent on the reactor as of the end of March this year was around 1.17 trillion yen. According to the agency, it costs tens of millions of yen to produce a single unit of fuel. There are 42 backup fuel units for the plant, but if these units had to be changed when restarting the reactor, that could bring additional costs.
Meanwhile, the Nuclear Regulation Authority has recommended that the management of the reactor be changed from the JAEA. Whether or not the reactor can be restarted remains unclear.

NHK video on Monju reactor

http://www3.nhk.or.jp/nhkworld/english/news/nuclearwatch/20151208.html

It was once dubbed a "dream reactor," but the dreams for the Monju nuclear plant in western Japan were shattered after a series of accidents that started 20 years ago on Tuesday.
The plant has been in operation for only 250 days over 2 decades.

1994... It was hailed as an answer to one of the downsides of nuclear power-- what to do with reactors' spent fuel. The multi-billion dollar Monju reactor was able to use the old fuel that contained plutonium to power itself.
But any hopes for the multi-billion-dollar facility were soon overshadowed by safety issues and mismanagement. In 1995, a leak of sodium used to cool the reactor led to a halt in operations. To make matters worse, video tapes from that time were concealed to cover up the details. Public backlash forced closure of the management company. The Japan Atomic Energy Agency took over.
But the problems didn't stop.
In 2010, a 3-ton piece of equipment fell into the reactor and couldn't be removed. In 2012, about 10,000 instruments were found to have not been properly inspected.
This former Monju director was open with NHK about the facility's problems.
"We were busy trying to bridge maintenance gaps. That significantly increased the workload of those on the spot. We had no manpower to spare, unable to properly manage things. That formed a vicious cycle, making things worse and worse on the shop floor."
Kazuo Mukai / Former Monju reactor director
The operator also admitted to the government that it failed to adequately assign and train a dwindling number of staff. Last month, the Nuclear Regulation Authority issued a recommendation to Science and Technology Minister Hiroshi Hase. It called for a new operator.
"We haven't seen acceptable improvements. We cannot fully trust the current organization."
Shunichi Tanaka / Nuclear Regulation Authority Chairman
A former member of the national nuclear commission, Nagasaki University Professor Tatsujiro Suzuki, says there needs to be discussion on the reactor's future. "We need to once again debate the real necessity of the research and development of this sort of reactor and at what cost," he says. "Then we can decide whether to "go" or "not go" with Monju."
The Science and Technology Ministry is still considering whether to appoint a new management body to resume operation or de-commission it altogether.
But residents are not waiting. They've been fighting against any reopening. They plan to file suit against the Nuclear Regulation Authority to shut it down for good.

December 25, 2015

Monju: False sodium leak alarm

Sodium leak false alarm at Monju reactor

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The Japan Atomic Energy Agency says a sodium leak alarm went off at its Monju fast-breeder nuclear reactor in Fukui prefecture. But it says no leak has occurred at the reactor that is not in operation.

The plant operator said the alarm sounded 4 times on Friday night from a device that detects leaks of sodium, which is used as a coolant.

Agency officials said another detector in the same room indicated there was no leakage. They now suspect a glitch in the device and are investigating the cause of the false alarm.

Monju is designed to use recycled plutonium. In December 1995, sodium leaked from the reactor's piping, causing a fire at the facility.
In the past few years, the Monju operator has been repeatedly criticized for its lax safety management.

Last month, the Nuclear Regulation Authority asked the science minister to replace the plant's operator within about 6 months.

December 26, 2015

Second lawsuit against NRA (Monju)

NRA targeted in second lawsuit against Monju reactor experiment

http://www.japantimes.co.jp/news/2015/12/26/national/locals-others-seeking-monju-decommissioning-file-suit-nra/#.Vn6gilIR-id

JIJI, Staff Report
Residents near the experimental Monju fast-breeder reactor in Tsuruga, Fukui Prefecture, are suing the Nuclear Regulation Authority to have the installation permit canceled.
On Friday, 106 people in 12 prefectures who live within 250 km of Monju filed suit at the Tokyo District Court, claiming the Japan Atomic Energy Agency, the manager of the trouble-prone prototype reactor, is unable to run it safely.
It is the second time residents have taken **legal action to decommission the experimental reactor.** The first attempt failed at the Supreme Court in 2005.
Among the plaintiffs this time are some from the first lawsuit and some forced to evacuate by the March 2011 triple core meltdown at Tokyo Electric Power Co.'s disaster-hit Fukushima No. 1 power plant.
The JAEA was established after a sodium leak accident and coverup bid at Monju in 1995 that forced the facility to close. After operations resumed in 2010, they were suspended again the same year after a massive fuel-exchanging device fell into the reactor, blocking access to the fuel rods.
Japan has reportedly spent more than ¥1 trillion on the Monju project to find a way to reliably produce more nuclear fuel than it uses.
Following the discovery of further problems, including large-scale inspection flaws, the NRA last month called for the manager, JAEA, to be replaced.
This month, the science and technology ministry, which has jurisdiction over JAEA, set up a panel to discuss the future of the experimental facility.
Tetsuen Nakajima, one of the plaintiffs, expressed **doubts about the panel's veracity, saying its members do not include anyone critical of the fast-breeder reactor.**
The 73-year-old resident of Obama, Fukui Prefecture, added he hopes the lawsuit will lead to a thorough public debate on Monju.

December 28, 2015

Who should run Monju reactor?

Panel holds first meeting on finding new Monju reactor operator

http://www.japantimes.co.jp/news/2015/12/28/national/panel-holds-first-meeting-finding-new-monju-reactor-operator/#.VoEQQFIR-ic

Kyodo

A government panel held its first meeting Monday to find a new operator for the Monju prototype fast-breeder reactor, as recommended by the National Regulation Authority.
The panel, set up by the education and science ministry, aims to conclude discussions and report its decision to the NRA within six months.
“We will make a decision on a new operator based on (the panel members’) expert knowledge,” education and science minister Hiroshi Hase said at the beginning of the meeting.
The NRA recommended in November that the minister pick a new entity to take charge of trouble-prone Monju, as it sees little progress in safety management under the current operator, the government-backed Japan Atomic Energy Agency.
The head of the NRA urged Hase to consider measures to ensure the reactor’s safety, including closing it if a replacement entity can’t be found within six months.
The government has been trying to develop a commercial fast-breeder reactor that can produce more plutonium than it consumes in a bid to recycle nuclear fuel in the future. Plutonium can be used as nuclear fuel by mixing it with uranium.
The government has spent more than ¥1 trillion on the project, but Monju’s repeated safety problems have left it idle much of the time since it first achieved criticality in 1994.
Industry observers said it will be hard to find a successor to operate the reactor, as it generates electricity in a more complex way than light-water reactors that utilities run at present.
Monju’s closure could lead to a drastic review of a nuclear policy the government has pursued for decades.
Akito Arima, the chief of the eight-member panel, said after the meeting that he doesn’t have a clear outlook at present for who could be a successor.
A former president of the University of Tokyo and education minister, Arima said he won’t rule out the possibility of shutting down the reactor. But he added that “the chance is low” as he believes engineers’ knowledge of such an advanced reactor and the large-scale investment to date should be put to maximum use.
During the meeting, the education and science ministry proposed main points of discussion, such as technology needed to run the project and how safety should be managed.
The panel members include scholars and those engaged in the nuclear power business.
Hase said after the meeting he is considering adding or changing members of the panel as discussions advance.
The ministry initially planned to hold the first meeting by mid-December, but it took longer than planned to form the panel as some people declined to serve on it.

Panel to study who should run fast-breeder reactor

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

A panel of Japan's science ministry has begun discussing who should run a fast-breeder nuclear reactor in Fukui Prefecture.

The 9-member panel of experts held its 1st meeting on Monday.

Last month, Japan's nuclear regulator called on science minister Hiroshi Hase to replace the operator of the Monju prototype reactor. A series of safety problems have been found at the plant, including failure to inspect thousands of items.

The president of the operator, the Japan Atomic Energy Agency, briefed panel members on what had happened and its report compiled last year on how to reform the plant's operation.

Some members of the panel criticized the Monju operator's report, saying the agency does not seem to be deeply analyzing the problems.

Others said it is also necessary to discuss what to do with the reactor, and how to conduct research and development of a fast-breeder nuclear reactor.

The panel decided to study how the agency is run and conducts its safety management to determine the fundamental causes of the problems.

It also decided to report to Hase in about 6 months the results of its discussions on who should take over the running of the plant from the agency.

January 5, 2016

Rokkasho: 2.94 trillion yen

Japan's ¥2.9 trillion nuclear recycling quest coming up on three decades

http://www.japantimes.co.jp/news/2016/01/05/national/science-health/japans-%C2%A52-9-trillion-nuclear-recycling-quest-coming-three-decades/#.Vou8V1IR-ov

by Emi Urabe and Stephen Stapczynski

Bloomberg

It's designed to recycle spent uranium from Japan's nuclear power plants, consists of more than three dozen buildings spread over 740 hectares, costs almost ¥3 trillion and has been under construction for nearly three decades. The amount of fuel successfully reprocessed for commercial use: zero.
Under construction since the late 1980s, the complex is designed to turn nuclear waste into fuel by separating out plutonium and usable uranium. The start date of the project has now been pushed back for the 23rd time, with operations set to commence in 2018.
The money continuing to pour into the Rokkasho reprocessing complex in Aomori Prefecture is raising speculation that attention is being diverted from more-promising avenues of energy development, including renewables.
"Reprocessing is an idea that seemed good to many in the nuclear industry when it was first proposed, but with time and experience has proven to be uneconomical," M. V. Ramana, a professor at Princeton University's Nuclear Futures Laboratory, said by email. "There is a lot of sense in the idea that Japan should just cut its losses and stop trying to get this plant to operate."
The idea for Rokkasho can be traced to the 1960s when the government decided to pursue a "closed nuclear fuel cycle" — a system which would allow resource-poor Japan to recycle old fuel in order to reduce import dependence and insulate itself from fluctuating prices.
The insistence on developing a closed fuel cycle has diverted funds, as well as generations of scientists and engineers, from renewables and other alternatives, according to Ramana.
"From the point of view of a nation with few natural resources, completion and stable operation of the nuclear fuel cycle is extremely important," said Makoto Yagi, chairman of Japan Nuclear Fuel Ltd., which operates the facility.

Construction of the Rokkasho facility, the heart of the endeavor, was supposed to be completed by 1997. Delays due to technical and safety issues have kept it from operating commercially while costs ballooned to an estimated ¥2.94 trillion, according to Japan Nuclear Fuel.
The government and the country's power industry view fuel reprocessing generally, and the project in Rokkasho specifically, as one of the only ways to lower import dependence and find a home for thousands of tons of highly radioactive spent fuel.
The facility was originally intended to separate plutonium from spent fuel for use in so-called fast-breeder reactors — plants that produce more fuel than they consume.
While Monju, the nation's first prototype fast-breeder reactor, has remained closed due to its own technical issues, Rokkasho expanded construction to include a facility that processes plutonium-uranium mixed-oxide fuel, known as MOX, that can be used in some of Japan's existing reactors.
In its most-recent delay, Japan Nuclear Fuel announced in November that commercial startup of its plutonium reprocessing facility would be delayed to 2018 due to post-Fukushima safety requirements. Start of the MOX facility was delayed to 2019.
Even when reprocessing begins, the recycled fuel won't be any cheaper than uranium, which has slumped about 49 percent on the spot market since the March 2011 Fukushima crisis.
"In the short term, recycling is not economically advantageous," Dale Klein, former chief of the U.S. Nuclear Regulatory Commission, said in an interview in Tokyo. "But it does things like reduce your volume" of spent fuel.

January 7, 2016

Reprocessing: "There is no option to call it off"

Nuclear Watch: 'Nursing care plan' for nuclear plants (Pt. 60)

http://mainichi.jp/english/articles/20160107/p2a/00m/0na/005000c

The Akatsuki Maru vessel that transported 1 metric ton of plutonium from France to Japan is pictured in this photo taken at a port in Tokai, Ibaraki Prefecture, on Jan. 5, 1993. (Mainichi)

Many of those involved in nuclear power say the electric power industry appears to have no intention to "die with the nuclear fuel cycle project."
The Nuclear Regulation Authority (NRA) recommended on Nov. 13, 2015, that the Japan Atomic Energy Agency (JAEA) be replaced by another entity as the operator of the trouble-plagued prototype fast-breeder reactor Monju.
Three days later, Japan Nuclear Fuel Ltd. (JNFL), which was founded on the initiative of the electric power industry, announced that the completion of its nuclear fuel reprocessing facility under construction in Rokkasho, Aomori Prefecture, will be delayed by about two years to the first half of 2018.
These two core facilities in the nuclear fuel cycle project, in which nuclear fuel spent at atomic power stations is reprocessed and reused in nuclear reactors, are in difficult situations.
In spring this year, electric power retail will be fully liberalized. Since consumers will be allowed to freely select electric power suppliers, competition between utilities is expected to intensify, which could cause the profits of electric power companies to decline. As such, the nuclear fuel cycle project is becoming increasingly burdensome for power companies as there are no prospects that the project will be put into practical use in the foreseeable future.
Nevertheless, Toichi Sakata, former vice minister at the Education, Culture, Sports, Science and Technology Ministry, has ruled out the possibility that the government will abandon the project.
"There is no option to call it off," says Sakata, 67, who was involved in the operation of the Akatsuki Maru vessel that transported plutonium from France to Japan.
This is not only because over 2 trillion yen has been spent on the project but also because the Aomori Prefectural Government would certainly demand that some 3,000 metric tons of spent nuclear fuel stored at the reprocessing facility be removed from the prefecture if the project were to be discontinued.
About 70 percent of pools for spent fuel at nuclear plants across the countries are filled, and they do not have enough capacity to store spent nuclear fuel if returned. The abandonment of the nuclear fuel cycle project could force electric power companies to suspend their nuclear power generation, which is a highly profitable business, causing great confusion.
The Economy, Trade and Industry Ministry took action in response to the situation. At a meeting of experts on Nov. 30, the ministry decided to set up an entity to supervise JNFL. By establishing a system to force electric power companies to engage in processing spent nuclear fuel, the national government showed its determination to continue the nuclear fuel cycle project. This may be a sign that Japan's atomic energy policy, in which private companies operate nuclear plants under national policy, will shift into one in which the government supervises atomic power business based on its own policy.
"It's so-to-speak a plan on 'nursing care' for atomic power stations," says Hitoshi Yoshioka, professor at Kyushu University.
Yoshioka points to the possibility that the accounting system and the system of paying compensation in case of a nuclear accident will be reformed and that a system similar to one under which utilities must buy electric power generated with renewable energy at fixed prices will apply to nuclear power.
The Economy, Trade and Industry Ministry has urged power companies to build more facilities to store spent nuclear fuel. In response, electric power companies announced on Nov. 20 last year that they will build such facilities with a total capacity of 6,000 tons, a 30 percent increase from the current capacity, by sometime around 2030. (By Haruyuki Aikawa, Senior Writer)

January 17, 2016

If the Monju project falls through...

Problems with prototype reactor threaten Japan's nuclear fuel recycling plan

http://www.japantimes.co.jp/news/2016/01/17/national/problems-prototype-reactor-threaten-japans-nuclear-fuel-recycling-plan/#.Vpu4DVKDmot

by Yoshio Takahashi

Kyodo

Japan's energy policy is facing major obstacles this year, as problems surrounding an experimental reactor threaten to foil long-laid plans to recycle nuclear fuel.

The government is trying to develop a commercial fast-breeder nuclear reactor to recycle nuclear fuel and raise the energy self-sufficiency rate, currently at about 6 percent, of the world's fifth-largest energy consuming country.

Resource-poor Japan imports all of its uranium for nuclear power generation — one of its core power sources — from Canada and other countries, but it seeks to make fuel on its own using an advanced fast-breeder reactor capable of producing more plutonium than it consumes.

Plutonium can be used as nuclear fuel for conventional and fast-breeder reactors by mixing it with uranium. Japan currently uses overseas companies to reprocess its spent fuel into uranium-plutonium mixed-oxide (MOX) fuel, with a view to homegrown reprocessing in the future.

The fast-breeder reactor development project recently hit a major stumbling block, however, that put the entire project at risk of shutting down.

The regulator instructed the government in November to consider steps to guarantee the safety of the trouble-prone Monju reactor, including an option to close it down if a new operator cannot be found within six months.

The government has spent more than ¥1 trillion ($8.27 billion) on Monju, a prototype fast-breeder nuclear reactor that remains under development.

But ongoing safety problems have left the reactor idled for much of the time since it first achieved criticality in 1994.

The Nuclear Regulation Authority has criticized the current operator, the government-backed Japan Atomic Energy Agency, for having made little progress in enhancing safety management even after a slew of safety problems led to a protracted halt in operations.

Hiroshi Hase, the science minister in charge of the project, set up a panel to discuss a possible successor to operate the reactor.

But the regulator's warning sparked concerns over the fate of the project, as many industry observers think it would be tough to find a replacement.

Establishing yet another government body is no longer a solution after the government's repeated attempts to create new entities to run Monju failed to realize safe operation, an NRA official said.

The JAEA, established in 2005 by the government through a merger of two former national nuclear research institutions, is already the Monju plant's third operator.

It would be too risky to let a private company take charge of the prototype reactor, which generates electricity in a more complex way than light-water reactors that many utilities run at present, experts said.

"A (private) power company doesn't have the technical expertise" to run a fast-breeder nuclear reactor, Makoto Yagi, chairman of the Federation of Electric Power Companies of Japan (FEPC), told reporters when asked about replacements for the JAEA.

The Japan Institute for National Fundamentals, a pro-nuclear activist group, criticized the NRA's decision as a move that could lead to the closure of Monju and a drastic overhaul of the country's nuclear energy policy.

The government should "correct the Nuclear Regulation Authority's excessive" behavior, the institute said in a newspaper advertisement in December, arguing that the NRA has no jurisdiction over the nation's energy policy.

Shunichi Tanaka, the head of the NRA, has repeatedly said his body wants the science minister, who is in charge of the Monju project, to ensure the experimental reactor's safety and has no intention to push the ministry to discontinue it.
"It is up to the ministry to decide" whether to close it, Tanaka said at a news conference.
Hideyuki Ban, co-director of the Citizens' Nuclear Information Center, an independent anti-nuclear advocacy group, said no power companies and government bodies have the ability to carry out the project safely.
"I think (closing it) is really what the government should do," he said.
Monju has a long track record of problems, starting with a major fire caused by a sodium leak in 1995 that resulted in the project being suspended until May 2010.
It was halted again in August of the same year after a fuel replacement device for the reactor was accidentally dropped, leaving it inoperable until now.
Shutting down the reactor due to safety issues would be tantamount to Japan giving up on development of a commercial fast-breeder reactor, Ban said.
However, terminating the project could create a new headache: the stockpiling of plutonium with no fast-breeder reactor running on MOX fuel to use it. Such a decision would reinforce international fears that the nuclear fuel could be put to military use.
Chinese envoy Fu Cong said in a speech to the U.N. General Assembly's First Committee in October that Japan's fissile materials inventory is already large enough to make more than 1,000 nuclear warheads.
The FEPC had planned to use such MOX fuel at 15 conventional reactors by the end of March 2016.
That plan, however, has been stalled since the Fukushima meltdowns of 2011 left most reactors in Japan suspended for safety reviews under newly tightened regulations.
If abandoning the fast-breeder reactor project derails Japan's plan to launch its own reprocessing of spent fuel, concerns are likely to grow over what to do with spent fuel.
"If the Monju project falls through, there is no doubt that calls for reviewing the energy policy will grow louder," Ban said.

January 24, 2016

16 billion yen of taxpayer money to promote MOX projects

Japan doles out over ¥16 billion in subsidies for slow-moving MOX projects

http://www.japantimes.co.jp/news/2016/01/24/national/science-health/japan-doles-%C2%A516-billion-subsidies-slow-moving-mox-projects/#.VqUByFKDmov

JIJI
The government has used taxpayer money to provide over ¥16.2 billion in subsidies to local governments for promoting so-called pluthermal power generation using mixed oxide fuel (MOX), a survey has shown.
The subsidies, financed with revenue from a tax for power-resources development imposed on electricity users, have been distributed to local governments that accepted pluthermal power generation at facilities in their regions.
The Jiji Press survey released Saturday illustrates that a large amount of taxpayers' money has been spent on the pluthermal project in order to win support from local governments.
The project, a key part of the country's nuclear fuel cycle policy, uses MOX fuel, a mixture of uranium and plutonium extracted from spent nuclear fuel.
So far, just four reactors in Japan have used MOX fuel, including reactor 2 at Tokyo Electric Power Co.'s Fukushima No. 1 nuclear power plant. The reactor, set to be decommissioned, experienced a core meltdown after the March 2011 earthquake and tsunami.

The Federation of Electric Power Companies of Japan hopes to eventually raise the nation's total number of reactors carrying out pluthermal generation to somewhere between 16 and 18.
However, pluthermal projects have failed to progress as expected, prompting critics to urge the central government to conduct an immediate review of its policy.
The other three reactors that have run on MOX fuel are the No. 3 reactor at Kyushu Electric Power Co.'s Genkai plant in Saga Prefecture, the No. 3 reactor at Shikoku Electric Power Co.'s Ikata plant in Ehime Prefecture and the No. 3 reactor at Kansai Electric Power Co.'s Takahama plant in Fukui Prefecture. The Takahama plant reactor is set to be rebooted later this month using MOX fuel.
The survey found that seven of the nine prefectural governments and all of the 10 other municipalities entitled to the subsidies — one to promote the fuel-cycle policy and the other to support host municipalities — have actually received the payments.
The exceptions, Hokkaido and Shizuoka prefecture, have refrained from applying for the subsidies.
While the Fukushima disaster has spurred safety concerns among citizens, a series of scandals — including attempts to influence public opinion — in favor of pluthermal projects — have eroded trust in the plan, sources said.
In Hokkaido, the No. 3 reactor at Hokkaido Electric Co.'s Tomari plant has been designated for pluthermal power generation. In Shizuoka Prefecture, the No. 4 reactor at Chubu Electric Power Co.'s Hamaoka plant has also been tapped for the pluthermal project.
Of the four prefectures where pluthermal generation has been carried out, Saga received ¥6.097 billion in state subsidies and Ehime was given a total of ¥6.059 billion by the end of fiscal 2014.
Fukui, meanwhile, has received ¥2.486 billion as of the end of 2013 and is expected to get more subsidies through fiscal 2015.

January 29, 2016

Takahama achieves criticality

Takahama reactor achieves criticality

http://www3.nhk.or.jp/nhkworld/english/news/20160130_12.html

Kansai Electric Power Company says a reactor that's been restarted in central Japan achieved criticality, a self-sustained nuclear reaction on Saturday morning, which should allow it to start generating power.

The Takahama plant's No.3 reactor in Fukui Prefecture is the third to restart under tougher government regulations introduced after the 2011 Fukushima Daiichi nuclear crisis.

On Friday, the plant's engineers removed some of the control rods from the reactor, and then restarted the facility.

After extracting 3 fourths of the control rods they cautiously adjusted nuclear fission reaction by controlling the density of materials in cooling water.
The utility plans to have the reactor generate power on Monday, if no problems are found with the performance of the control rods and other equipment. The resumption of commercial operation is planned for late February.

The operator says it will closely monitor whether the reactor's equipment is functioning properly after being offline for almost 4 years.

Part of the fuel used is a MOX type, a mixture of plutonium extracted from spent nuclear fuel and uranium. It forms part of Japan's nuclear fuel recycling system.
The reactor would be the first to use MOX fuel under the new regulations.

Two reactors at the Sendai nuclear plant in the southwestern prefecture of Kagoshima resumed operations last year.

Japan restarts 2nd nuclear complex under tighter post-Fukushima rules

http://mainichi.jp/english/articles/20160129/p2g/00m/0dm/074000c

FUKUI, Japan (Kyodo) -- A reactor at a nuclear plant in western Japan resumed operation Friday, becoming the second complex to restart, and the first running on uranium-plutonium mixed oxide fuel, under stricter safety rules set after the 2011 Fukushima nuclear disaster.
Kansai Electric Power Co. said it reactivated the No. 3 reactor at its Takahama plant in Fukui Prefecture nearly a year after it gained approval for resumption from the Nuclear Regulation Authority.
It is the third reactor operating under post-Fukushima regulations, following two reactors at Kyushu Electric Power Co.'s Sendai plant in Kagoshima Prefecture, which were restarted last August and October, respectively.
The government is pushing ahead with nuclear restarts after all of the country's 48 reactors were shut down for safety reviews following the Fukushima accident.
The state looks to generate at least 20 percent of Japan's overall electricity with nuclear power by 2030 despite public opposition to nuclear power remaining strong since the disaster at the Tokyo Electric Power Co. plant.
Last April, a district court banned Kansai Electric from restarting the Nos. 3 and 4 reactors of the Takahama plant, citing safety concerns.
The same court lifted the injunction last month, allowing the utility to resume the two units, both 870-megawatt pressurized water reactors that began commercial operations in 1985.

January 30, 2016

Spent MOX fuel: Where to?

Restart of Takahama nuke plant refuels question about spent MOX fuel

http://mainichi.jp/english/articles/20160130/p2a/00m/0na/013000c

Japan has resumed its "pluthermal" power generation project using uranium-plutonium mixed oxide fuel (MOX fuel) for the first time in three years and 11 months, with the reactivation of the No. 3 reactor at the Takahama nuclear power plant in Fukui Prefecture on Jan. 29.
The spent MOX fuel to be generated at the plant, however, will have nowhere to go for reprocessing, just as conventional spent nuclear fuel -- leaving Japan with yet another nuclear waste problem.
"The reactor restart bears great significance in terms of promoting the nuclear fuel cycle," said Economy, Trade and Industry Minister Motoo Hayashi at a press conference on Jan. 29.
The government has promoted the nuclear fuel cycle as part of its national policy and has been seeking to breed plutonium while using it to fuel fast-breeder reactors.

However, the Monju prototype fast-breeder reactor in Fukui Prefecture has hardly been operational due to a sodium leak accident in 1995 and a spate of other problems, giving way to the pluthermal project that emerged as an alternative way out.
The prospect of successfully reprocessing spent nuclear fuel -- a precondition for the nuclear fuel cycle -- is nowhere in sight in Japan. Construction of the Japan Nuclear Fuel Ltd.'s spent fuel reprocessing plant in Rokkasho, Aomori Prefecture, is lagging behind schedule, and spent fuel has been accumulating on the premises of each nuclear plant across the country. At the Takahama complex, spent nuclear fuel has filled two-thirds of its capacity.
In October last year, the government drew up a plan to expand the country's capacity to hold spent nuclear fuel. Kansai Electric Power Co. unveiled a plan to start operating an interim storage facility for spent nuclear fuel outside of Fukui Prefecture sometime around 2030, but no specific steps are in sight.
While the destination of conventional spent nuclear fuel is already unclear, reprocessing of spent MOX fuel poses yet further challenges. Because spent MOX fuel is beyond the capacity of the Rokkasho plant, there needs to be built yet another plant dedicated to reprocessing spent MOX fuel. However, there's not even a blueprint for building such a plant.
"For the time being, we will properly keep (spent MOX fuel) within the grounds of the Takahama plant," said a Kansai Electric Power Co. official.
Hideyuki Ban, co-director of the Citizens' Nuclear Information Center, said, "It is unclear whether spent nuclear fuel will really be reused, while the final disposal site has yet to be decided. It is likely that spent fuel will continue to be kept at each nuclear plant. Power companies are now facing the high price for having prioritized reactor restarts and construction."

January 31, 2016

Takahama: from 5.3 to 18.5 tons of MOX

Restarts threaten to increase amount of deadly MOX at Takahama plant to 18.5 tons

http://www.japantimes.co.jp/news/2016/01/31/national/restarts-threaten-increase-amount-deadly-mox-takahama-plant-18-5-tons/#.Vq4jY1KDmot

JIJI
Restarting a second reactor at the Takahama nuclear power plant in Fukui Prefecture will raise the amount of highly toxic spent mixed-oxide (MOX) fuel present there to an estimated 18.5 tons, Jiji Press has learned.

The plant run by Kansai Electric Power Co. in the town of Takahama had 5.3 tons of MOX — a blend of uranium and plutonium extracted from spent nuclear fuel — there before Friday's restart of the No. 3 reactor.
But lingering problems threaten to ruin the government's long-laid plans for recycling nuclear fuel, leaving spent MOX in need of a home. This means it is likely to join the standard uranium fuel being kept in the nation's rapidly dwindling storage pools until a solution can be found.
The Takahama plant is set to hold the largest amount of spent MOX among domestic nuclear facilities that have engaged in so-called pluthermal power generation utilizing the blended fuel, which can contain weapons-grade plutonium.
Takahama No. 3 is slated to use 24 units of MOX, according to Kansai Electric. Reactor 4 will use four units. Each fuel unit weighs about 660 kg, according to statistics from the Finance Ministry and other data.

Kepco imported 12 French-made MOX units in June 2010 and an additional 20 in June 2013. The utility's Genkai plant in Saga Prefecture and Shikoku Electric Power Co.'s Ikata plant in Ehime Prefecture have about 10.7 tons of spent MOX each — more than any other commercial nuclear plants in japan.
Among noncommercial facilities, the Japan Atomic Energy Agency currently has 63.9 tons stored at Fugen, an advanced converter reactor in Fukui, 23.1 tons at its nuclear fuel reprocessing facility in Ibaraki Prefecture, and 6.1 tons at the experimental Monju fast-breeder reactor in Fukui.
Takahama No. 3 is the nation's third reactor to be rebooted under new safety standards compiled since the Fukushima nuclear disaster began in March 2011.
Kansai Electric plans to reactivate Takahama's No. 4 reactor later this month.

February 5, 2016

Japan Nuclear Fuel Limited to be replaced, says Govt.

Govt. to bolster role in nuclear fuel recycling

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's Cabinet has approved a bill on increasing government involvement in the nuclear fuel recycling program.

The bill approved on Friday would replace Japan Nuclear Fuel Limited with a state-authorized corporation as the main player in the program.

Japan Nuclear Fuel Limited is a private company funded by major electricity suppliers.

The government has looked for secure ways to sustain the program due to concern that the suppliers could withdraw if their business worsens after the retail market for electricity is fully opened up this April.

State-authorized bodies won't be dissolved without government permission.

The bill calls for requiring utility companies to continue their financial contribution after the new body is launched.

Industry minister Motoo Hayashi told reporters that outside experts will be involved along with the government in managing the new organization.

He added that governance in nuclear fuel recycling will be strengthened.

March 23, 2016

Tokyo lawsuit over Monju breeder reactor

Govt., residents argue in court over Monju reactor

http://www3.nhk.or.jp/nhkworld/en/news/20160323_26/

A Tokyo court has begun hearing arguments in a lawsuit filed by residents seeking to revoke a government permit for a prototype fast breeder reactor in Fukui Prefecture. The facility has been mostly idle since an accident in 1995.

Some 100 residents of Fukui and neighboring prefectures filed the suit to demand that Japan's Nuclear Regulation Authority cancel its permit for Monju.

They accused the reactor's operator, the Japan Atomic Energy Agency, of incompetence, and cited risks of serious accidents triggered by earthquakes or tsunami.

At the Tokyo District Court on Wednesday, plaintiff Fukiko Ikejima said Monju has been idle for about 20 years, and that the government's nuclear fuel recycling program has failed.

The government countered that the dangers claimed by the plaintiffs are abstract, and that no risk of grave damage could be found. It asked the court to dismiss the case.

Last November, the Nuclear Regulation Authority asked the science minister to replace the reactor's operator, citing lax safety management. A ministry panel is discussing the matter.

Monju was expected to be part of Japan's nuclear fuel recycling system. The reactor was designed to produce more fuel than it consumes.

May 21, 2016

US ready to rethink agreement

US would back a rethink of Japan's plutonium recycling program: White House

http://www.japantimes.co.jp/news/2016/05/21/national/politics-diplomacy/u-s-back-rethink-japans-plutonium-recycling-program-white-house/#.V0CKnORdeot

Kyodo
WASHINGTON – The United States would back a change to Japan's nuclear fuel reprocessing program because there are concerns it may lead to an increase in its ally's stockpile of unused plutonium, a senior White House official said.
If Japan were to change course "they would find the United States to be supportive," Jon Wolfsthal, senior director for arms control and nonproliferation at the National Security Council, said in a recent interview.
Wolfsthal's remark reflected concerns in President Barack Obama's administration about the future of Japan's large plutonium stockpiles, which can be used to make nuclear weapons.
Wolfsthal said the upcoming renewal in 2018 of a bilateral nuclear agreement with Japan "has the potential to become a very controversial issue."
The 1988 pact authorizes Japan to reprocess used nuclear fuel when the fuel includes U.S.-produced uranium.
"There is no question that plutonium recycling in Japan has been expensive, that it is a challenging future for Japan," Wolfsthal said.

In March, Foreign Minister Fumio Kishida defended the reprocessing of used nuclear fuel, saying the United States has approved it.
The United States and Japan have discussed what a decision to have large stockpiles of plutonium that "don't have a dedicated pathway to use and disposition" means for global efforts to restrict reprocessing and enrichment, he said.
If Japan keeps recycling plutonium, "what is to stop other countries from thinking the exact same thing?" Wolfsthal said, apparently referring to concerns that other Asian countries such as China and South Korea may compete to get involved in similar projects.
Under the Japanese reprocessing program, plutonium extracted from used nuclear fuel is recycled to make plutonium-uranium mixed oxide fuel usable at nuclear power plants. Japan has licensed companies in foreign countries such as Britain and France to produce the so-called MOX fuel.
Japan came up with the plutonium recycling program in the face of potential international suspicion that a large stockpile of plutonium could encourage it to go nuclear.
But the plutonium recycling effort has hit a snag because most of Japan's nuclear plants have suspended operations due to public safety concerns since the meltdowns at the Fukushima No. 1 plant following the giant earthquake and tsunami in 2011.
Obama has urged Japan and other countries to give up unused nuclear materials including plutonium as part of his efforts to strengthen control over the management of nuclear substances all over the world to prevent terrorists from obtaining them.
Japan had 48 tons of plutonium as of the end of 2014 and sent 331 kilograms of plutonium to the United States earlier this year.

May 23, 2016

Recycling fuel policy "almost a fantasy"

EDITORIAL: There is simply no reason to continue Monju reactor program

http://www.asahi.com/ajw/articles/AJ201605230020.html

An expert council on the Monju fast-breeder reactor program started debate last week on a draft report it will submit to the science and technology ministry.
The panel's work is a response to the Nuclear Regulation Authority's recommendation last year that the operator of the troubled experimental reactor in Tsuruga, Fukui Prefecture, should be replaced.
After a series of revelations about omitted safety inspections and other problems, the NRA in November urged science and technology minister Hiroshi Hase to find a new entity to replace the government-backed Japan Atomic Energy Agency as the reactor's operator.
But the council's draft report, released on May 20, doesn't name a candidate for the mission. It only mentions a set of conditions the new operator should fulfill, which are nothing new and all part of conventional wisdom.
It says, for instance, the new operator should have "the ability to develop and implement operation and maintenance plans based on the characteristics of the reactor that is still in the experimental stage." It also says the new operator should be able to respond appropriately to the interests and needs of society.
The draft report also points to the failure of a series of reforms that have been carried out to save the trouble-plagued program. It offers no reason to believe this time is different and the proposed replacement of the operator will bring about sufficient improvements in the management of the Monju.

The fast-breeder reactor requires as much as 20 billion yen ($182 million) in annual maintenance costs. In addition, there is not even an estimate of the certainly huge costs for necessary safety measures.
All these facts make a compelling case for decommissioning the reactor.
The biggest problem, as some members of the ministry panel have noted, is the **lack of serious debate on the cost-effectiveness of the Monju program.**
Who needs this program and how strong is the need? How much more money is the government ready to spend to develop and operate the reactor? These and other key questions about whether the program makes economic sense have been left unaddressed.
The Monju is now in a precarious position even in the government's nuclear energy policy.
The reactor was once touted as the core facility for the government's plan to establish a nuclear fuel recycling system in which plutonium extracted from spent nuclear fuel is burned in a fast-breeder reactor.
For more than two decades since a sodium coolant leak accident in 1995, however, the Monju has remained mostly idle.
Over the period, the need for a nuclear fuel recycling system has kept diminishing. There are now few people in the private sector calling for the development of a fast-breeder reactor.
When it drew up a research plan using the Monju three years ago, the science and technology ministry had to focus on the topic of nuclear waste disposal rather than fast-breeder reactor technology itself.
Still, the government has refused to pull the plug on the Monju program because it is concerned about possible repercussions on its nuclear fuel recycling policy as a whole.
But **this vision is now almost a fantasy**. If the government admits this fact, however, the issue of how to dispose of the large amounts of spent nuclear fuel stored at nuclear power plants across the nation will no doubt come under the spotlight.
Continuing the Monju program simply to gloss over this grim reality would be too foolish.
A small experimental reactor is enough and more efficient for use in research in nuclear waste disposal, which is still in a rudimentary stage. The need for such research offers no rationale for keeping the Monju program alive.

May 25, 2016

Monju: till when?

How long will Monju limp on?

It seems the government is trying to shelve a decision on the fate of the troubled Monju prototype fast-breeder reactor. A panel of experts at the education and science ministry, created in response to a recommendation by the Nuclear Regulation Authority in November that the ministry replace the operator of the long-dormant facility in Tsuruga, Fukui Prefecture or "fundamentally review" the program itself, has compiled a report calling for beefing up governance of the Monju operator without identifying who should take over its operation from the government-backed Japan Atomic Energy Agency (JAEA) — which was declared by the NRA as unfit to safely operate the fast-breeder reactor.
Based on the report, the ministry reportedly hopes to specify a new operator by summer — likely after the Upper House election in July — in its response to the NRA. But it seems questionable that the ministry can come up with a credible answer that can convince the NRA in just a few months. Monju's operator has been revamped and reorganized over the two decades since its 1995 sodium coolant leak and fire — during which the reactor was mostly kept offline — but as repeatedly pointed out by the nuclear regulator, little improvement has been made in its operation. The power industry, which runs

its own nuclear power plants, is reluctant to take charge of the reactor, which it says is still in the "research and development phase."
A glance at Monju's history would leave one wondering why no decision has been made yet to decommission the troubled facility. Once called a "dream reactor" designed to produce more plutonium than it consumes as fuel in this energy-scarce country, Monju first reached criticality in 1994 but has been in operation for only 250 days in total over the past 21 years. The 1995 accident exposed the difficulty of managing its unique technological feature of using sodium as a coolant. After being idled for 14 years, it was briefly put back online in 2010 — only to be halted again due to another accident. Subsequent revelations of sloppy safety checkups by the operator led the NRA to effectively order a ban on Monju's operation.
More than ¥1 trillion in taxpayer money has so far been poured into Monju, the sole prototype reactor of the technology deemed to be a crucial component of the nation's policy of seeking a nuclear fuel cycle — in which spent fuel from nuclear power plants would be reprocessed into fresh fuel. Even though the reactor has been kept offline for most of the past two decades, its maintenance alone costs ¥20 billion a year. A recent estimate by its operator reportedly showed that it would cost at least ¥43 billion to restart Monju under the NRA's new tighter safety standards — a figure that is not believed to reflect the extra cost of reactivating the long-idled facility. Meanwhile, most other countries have given up on commercializing the fast-breeder reactor technology due to the technical hurdles and the massive costs involved.
Still, the government keeps the Monju project alive, and remains hesitant to review its troubled nuclear fuel cycle policy. The experts panel, led by former University of Tokyo dean and education minister Akito Arima, did not examine the wisdom of keeping the costly project going. Instead, as it says in the report to be finalized in its ninth and final session on Friday, it mostly focused on what will be required of its new operator — on the assumption that it will continue. The draft report at the same time says that it will be difficult to restart Monju unless safety concerns about the reactor on the part of the NRA and the public have been addressed.
In its draft report, the panel points out that Monju's government-backed operator has relied on power companies and plant makers for reactor maintenance. As a result, Monju's proper workers have not attained sufficient technological expertise and training. In addition, its brief period online — essentially limited to just two years after reaching criticality — left little accumulation of knowledge about its operation and the workers who had actual experience running the plant have retired without passing on their knowledge.
The report calls for improving the governance of Monju's operator by introducing outside experts to take part in its management and operation. But it lacks much further specifics on how such changes can overcome the problems that marred JAEA's operation of the reactor. It's not even clear whether the panel or the ministry has either a new operator or revamping the current operator once again in mind.
It remains to be seen what decision the science ministry will make based on the panel's report, and how the NRA will evaluate the decision. But discussions so far do not appear to provide convincing grounds for continuing the Monju project.

June 2, 2016

"A costly hot potato"

Japan's Monju reactor a costly hot potato no one wants to handle

http://www.japantimes.co.jp/news/2016/06/02/national/japans-monju-reactor-costly-hot-potato-no-one-wants-handle/#.V1EiIuRdeos

by Emi Urabe and Stephen Stapczynski
Bloomberg

Japan is missing its own deadline to find a new operator for a prototype nuclear power program that has failed to succeed in the two decades since it was built, threatening the resource-poor country's support of a technology other nations have abandoned.
The country's nuclear regulator in November demanded that a replacement for the government-backed Japan Atomic Energy Agency be found within six months for the troubled Monju fast-breeder reactor in Fukui Prefecture. Monju, which has functioned for less than a year since its completion more than 20 years ago, now faces the possibility of being scrapped.
The fast-breeder reactor — a cornerstone of Japan's atomic energy strategy dating back to the 1950s — uses spent nuclear fuel from other atomic plants and is designed to produce more fuel that it consumes. The reactor, named after the Buddhist deity of wisdom, has cost the nation more than ¥1 trillion and has barely operated since it first generated electricity in 1995, the year it suffered a sodium leak that led to a fire and subsequent attempted cover-up. Safety problems have continued to plague the facility ever since.
"The potential closure of Monju would be a major blow not just to the fast-breeder community in Japan, but also those supporting reprocessing of spent fuel," M.V. Ramana, a professor at Princeton University's Nuclear Futures Laboratory, said by email. "I wonder if the government will allow Monju to be shut down? I would expect that they will simply create a new agency to oversee Monju."
Monju is currently operated by the JAEA, a quasi-government organization that is under the Ministry of Education, Culture, Sports, Science and Technology. JAEA declined comment. The nation's nuclear watchdog, the Nuclear Regulation Authority, did not respond to emailed questions regarding the status of Monju.
"We don't have plans to decommission the reactor," said Hiroki Takaya, director of the ministry's International Nuclear and Fusion Energy Affairs Division, which oversees Monju. "We are exploring many different options for who will operate the reactor — either a new entity or an existing company."
The NRA said in November the science ministry must find a new operator or consider decommissioning. The ministry drafted criteria for a new operator, but has yet to name a replacement, it said on May 27. The ministry hopes to find an operator as soon as possible, but has not set a concrete deadline.
"These turn out to be very expensive technologies to build," Allison MacFarlane, a former chairman of the U.S. Nuclear Regulatory Commission, said by email. "Many countries have tried over and over. What is truly impressive is that these many governments continue to fund a demonstrably failed technology."
While the science ministry seeks a new operator of Monju, no power utility has stepped forward. "Monju's reactor design is quite different from a normal reactor, and utilities don't have the expertise to handle it," Makoto Yagi, chairman of the Federation of Electric Power Companies of Japan, told reporters in May. "Monju is currently in a research and development phase by the government; it isn't the matter for a private company."

June 6, 2016

Monju: The question should be how to shut it down

Editorial: Time to permanently shut down Monju nuclear reactor

http://mainichi.jp/english/articles/20160606/p2a/00m/0na/018000c

The Ministry of Education, Culture, Sports, Science and Technology expert committee tasked with considering the future of the Monju experimental fast-breeder nuclear reactor in Tsuruga, Fukui Prefecture, has put together its report.

- 【Related】Japan enacts law to expand gov't role in nuclear fuel reprocessing
- 【Related】Decommissioning of troubled fast-breeder reactor Monju would cost 300 billion yen
- 【Related】Nuclear Watch: The Monju reactor's enormous expense

The Monju project has been plagued by mishaps and scandals, including serious oversights during inspections. As such, the Nuclear Regulation Authority (NRA) advised the science minister in November last year that the Japan Atomic Energy Agency (JAEA) should "exit" as Monju's managing body.

It must be pointed out, however, that **the committee's deliberations were based on the assumption that the Monju project would be continued, and considered only how it would be managed.** In the end, nothing about Monju may change except the sign above the door -- exactly the outcome the NRA warned it would not accept.

Does Monju have a valid place in Japan's energy policy? How much will the reactor cost to operate going forward? These questions go straight to the heart of the Monju project, but they have been and continue to be ignored. The government could be looking to keep Monju going uselessly, and this cannot be allowed.

The expert committee report specifies prerequisites for a new reactor operator, including bringing in specialists from the industrial and legal sectors to join its management board. **The science ministry will apparently decide on the new operator of the Monju reactor by this summer, and submit it to the NRA.**

The report also calls for the appointment of a person with experience running a power plant to a leadership position, and strengthening maintenance and management systems.

However, **the Federation of Electric Power Companies of Japan has already stated that none of its members has any intention of taking over Monju's management**. The fast-breeder reactor is quite different from commercial reactors, and requires handling volatile sodium coolant. The expert report admits that JAEA is the only organization in Japan with the expertise to deal with sodium coolant, and says that **the committee believes the reactor operator will have to be left to a government-related body or specially licensed company.**

Put all this together, and **it appears that the new Monju operator will include people from outside the nuclear power industry at the top, but leave on-site operation of the plant in the hands of the current staff.**

The suggestion to bring in outsiders is a repeat of recommendations for past JAEA reforms, so there's nothing new to see there.

The government has promoted Japan's nuclear fuel cycle policy of extracting plutonium from spent fuel and using this reprocessed fuel again in reactors. The Monju reactor, which burns plutonium, is essential to putting the fuel cycle into effect.

However, the Monju reactor has been shut down almost continuously since a 1995 sodium leak. The national government has invested more than 1 trillion yen in the project so far, and it takes about 20 billion yen a year to keep the plant running. Many other rich industrialized nations have given up on fast-breeder reactor development because of its technical and cost hurdles. The fuel cycle project is effectively broken beyond repair.

Under Japan's basic energy policy, passed by the Cabinet two years ago, Monju had a central role in research and development to solve the country's nuclear waste problem. This R&D can be conducted at other facilities, and there is no reason to prolong Monju's life.

It's time for the government to decide, not on how Monju will continue, but on how it will be shut down for good.

August 3, 2016

Trouble again at Monju reactor

Repeated problems at Monju reactor

http://www3.nhk.or.jp/nhkworld/en/news/20160803_32/

Another maintenance irregularity has come to light at the currently-idle Monju experimental reactor in Fukui Prefecture, central Japan. Japan's Nuclear Regulation Authority learned on Wednesday that workers at the prototype fast breeder reactor failed to follow a manual for 6 months after an alarm went off at the pool for spent nuclear fuel.

The alarm last November indicated that water inside the pool had become dirty.

The procedural manual says if the alarm goes off, workers must replace ion exchange resins inside the water purification system. But the resins weren't there in the first place, and workers didn't install them until May this year.

The regulatory authority judged it as a violation of safety provisions.

It recommended last November that the reactor's operator be replaced. It said the operator, the Japan Atomic Energy Agency, was unfit for the job after as many as 10,000 safety oversights were revealed at the reactor.

Authority members pointed out the latest report underscores the lack of alertness among workers, as the alarm went off immediately after the recommendation. They called the repeated safety violations a serious problem.

Authority Chairman Shunichi Tanaka said it's deplorable that a culture of safety is fundamentally lacking at Monju.

The Japan Atomic Energy Agency refuted claims that workers did nothing for 6 months. Officials said that they didn't consider the alarm to be urgent as water quality sensors were at a higher sensitivity than the standard.

The agency added that it took what it thought were necessary measures, having removed dirt from the surface of the water to improve the water quality and increasing monitoring.

August 18, 2016

Ban maintained on Monju

Nuclear regulators keep ban on Monju reactor

http://www3.nhk.or.jp/nhkworld/en/news/20160818_23/

Japan's nuclear regulator has dismissed a plea to lift its order banning the operation of an experimental reactor in Fukui Prefecture.

The Nuclear Regulation Authority in 2013 ordered the Japan Atomic Energy Agency, which operates the prototype Monju fast breeder reactor, to keep it offline.

The order came after the operator was found to have failed to inspect about 10,000 items at the plant.

On Thursday, officials of the operator asked the authority to lift the order, saying they had improved situations that constituted violations of safety provisions.

The officials said they had completed maintenance of all relevant devices by April, and reviewed maintenance methods based on each one's importance.

They also said they plan to upgrade checking systems by using information technology to decrease errors.

But the authority expressed doubt, saying another maintenance irregularity was found at the plant this month.

The authority recommended last November that the reactor's operator be replaced.

But discussions on a successor have not been concluded, and it is unknown when the reactor will be allowed to resume operation.

August 29, 2016

Monju alive or scrapped will cost hundreds of billion yen

Japan considers scrapping fast-breeder reactor as costs mount

http://www.japantimes.co.jp/news/2016/08/29/national/japan-considers-scrapping-fast-breeder-reactor-costs-mount/#.V8RCKDXrlaU

Kyodo
The government is considering scrapping the troubled Monju fast-breeder reactor after calculating that readying it for restart would cost several hundred billion yen, sources said Monday.
A political decision on decommissioning the reactor is now in sight, with Chief Cabinet Secretary Yoshihide Suga joining talks to determine its fate, the sources said.
The facility in Fukui Prefecture has been beset by safety problems and has only been **operational for a total of 250 days since it first went critical in 1994**.
Decommissioning Monju would deal a serious blow to the nation's vaunted fuel cycle policy, in which the reactor was designed to play a central role. The plan is to develop a commercial fast-breeder reactor that produces more plutonium than it consumes.
The science ministry has been trying to find a new entity to run the reactor, which is currently operated by the government-backed Japan Atomic Energy Agency.
The ministry was ordered to do this by the Nuclear Regulation Authority in November, after the NRA expressed exasperation with the operator's consistent failure to make the plant a success.

Nuclear safety has been a hot-button issue in Japan in the wake of the disaster in 2011 at the Fukushima No. 1 nuclear plant.
The ministry has been consulting a panel of energy experts on whether to keep Monju alive or to scrap it but has failed to identify a new entity to take over management.
In either case, substantial amounts of money are needed. The agency estimated in 2012 that it would cost around ¥300 billion to scrap the reactor in a process lasting over 30 years.
Safety problems included a major fire caused by a sodium leak in 1995.
The total of 250 operational days has come at a cost of more than ¥1 trillion in building and maintenance costs.
If Monju restarts operations, the ministry says its fuel must be replaced. In the event of a restart, new guidelines for fast-breeder reactors must also be created and any related construction will have to reflect these guidelines.
Making the building's facilities meet the new guidelines will likely cost nearly ¥100 billion, the sources said, adding there would be further expenses for replacing old equipment.

Running Monju reactor for 10 years would cost gov't 600 billion yen extra

http://mainichi.jp/english/articles/20160829/p2a/00m/0na/017000c

The government has calculated it will face about 600 billion yen in additional expenditure to keep the trouble-plagued Monju fast-breeder reactor operating in the Fukui Prefecture city of Tsuruga for another 10 years under current plans, it has been learned.
The government has already spent 1.2 trillion yen on the reactor, though the reactor has spent hardly any time in operation and remains idled. A team under Chief Cabinet Secretary Yoshihide Suga is now carefully considering what to do with the reactor, including the possibility of decommissioning it.
The Nuclear Regulation Authority (NRA) recommended to the Minister of Education, Culture, Sports, Science and Technology in November last year that jurisdiction of the reactor be switched from the Japan Atomic Energy Agency (JAEA) to another organization. It said that if this was not possible, then its operation should be drastically revised, or the reactor be decommissioned. The science ministry had been moving to separate the reactor's operational and management divisions from the agency and place them in the hands of a new corporation.
According to multiple government sources, after the NRA creates new standards for fast-breeder reactors based on lessons learned from the meltdowns at Tokyo Electric Power Co.'s Fukushima No. 1 Nuclear Power Plant, renovation work to meet these standards will become necessary in order to restart the Monju reactor. In operating the reactor, one quarter of its 198 fuel rods need to be replaced every four months, but the factory in Tokai, Ibaraki Prefecture, that produces Monju's fuel has not yet conformed to the new standards, and needs to be reinforced against earthquakes.
The Cabinet Secretariat has played a central role in considering the cost of operating the reactor. It is estimated that expenditure over a 10-year period, factoring in fuel production costs, power costs and personnel expenses, will reach about 600 billion yen. Even now, with the reactor idled, the annual cost of maintaining it stands at about 20 billion yen.
Some government officials are taking a stern view of the situation. One official voiced opposition to keeping the Monju reactor in service, saying that the amount being spent on it could be used to build a demonstration reactor (the next step after a prototype reactor), and that it is difficult to explain to the public the significance of spending so much.
The JAEA in 2012 calculated that it would cost about 300 billion yen to decommission the reactor, so either way, a large amount of public spending will be required.
Construction of the Monju reactor began in 1985, and it started generating electricity in August 1995, but around three months later it was closed due to a leak of sodium, which is used to cool the reactor.

In May 2010 the reactor was reactivated, but 3 1/2 months later an accident with a fuel exchange component caused the reactor to be taken off-line. As a result it has operated and produced power for less than a year.
A science ministry official commented, "There are various preliminary calculations based on the envisaged methods of operation after the reactor is restarted, and we are scrutinizing those. We cannot comment on the cost."

September 2, 2016

MOX being prepared for suspended reactor

Production starts on MOX fuel for Takahama unit

http://www.world-nuclear-news.org/UF-Production-starts-on-MOX-fuel-for-Takahama-unit-0209165.html

France's Areva has started fabrication of 16 mixed-oxide (MOX) fuel assemblies for use in unit 4 of the Takahama nuclear power plant, Kansai Electric Power Company announced on 30 August. Although the unit is one of five Japanese reactors to have been restarted, a court injunction has suspended its operation.

Unit 3 of Kansai Electric Power Company's Takahama nuclear power plant in Fukui prefecture resumed operation on 29 January. Takahama 4 was restarted on 26 February, but has remained offline since 29 February following an automatic shutdown of the reactor due to a "main transformer/generator internal failure". However, an injunction imposed by a district court on 9 March led to unit 3 being taken offline as well and both units have since remained idle.

Kansai said that four MOX fuel assemblies were among the 157 assemblies loaded into Takahama 4 before its restart in February. It said that the production of a further 16 assemblies for use in the unit is now under way at Areva's Melox facility in France.

The company noted that 24 MOX fuel assemblies were loaded into the core of unit 3 in December prior to its restart.

Areva signed a contract with Kansai in March 2008 to supply 12 MOX fuel assemblies for use in Takahama units 3 and 4. It signed a second contract in November of that year for the supply of a further 36 assemblies.

The first shipment of 20 MOX fuel assemblies under the second contract was delivered in June 2013. Of those, 16 have been loaded into Takahama unit 3, while four are being stored in the unit's used fuel pool.

MOX fuel contains plutonium recovered from used fuel by reprocessing. Used fuel from Japan, and other countries, has been routinely reprocessed in Europe, with MOX fuel and high-level waste being returned. Japan is working towards opening its own MOX fabrication facility, and has not sent used fuel to Europe for reprocessing since 1998.

In February 1997, the Japanese government stated that, in line with the country's long-term commitment to nuclear energy, it was necessary for Japan to start using MOX fuel in its commercial nuclear reactors. Following this announcement, the Japanese electric power companies unveiled their plans to use MOX fuel in 16 to 18 reactors. Since then, several MOX fabrication contracts have started this process.

Researched and written
by World Nuclear News

September 4, 2016

High time to put an end to Monju once "dream reactor"

Monju and the nuclear fuel cycle

http://www.japantimes.co.jp/opinion/2016/09/04/editorials/monju-nuclear-fuel-cycle/#.V8wUC6Jdeos

Media reports that the government is finally weighing whether to pull the plug on the Monju fast-breeder reactor in Tsuruga, Fukui Prefecture, due to the massive cost needed to restart the long-dormant facility, should come as no surprise. Once touted as a "dream reactor" for an energy-scarce country that produces more plutonium than it consumes as fuel, Monju has been a nightmare for national nuclear power policy for the past two decades. The sole prototype reactor for this kind of technology has been in operation a mere 250 days since it first reached criticality in 1994. It has mostly been offline since a 1995 sodium coolant leak and fire. Its government-backed operator has been declared unfit by nuclear power regulators to run the trouble-prone reactor, and the education and science ministry, in charge of the project, has not been able to find a viable solution.

More than ¥1 trillion in taxpayer money has so far been spent on Monju, and maintenance alone costs ¥20 billion a year. Restarting the reactor under the Nuclear Regulation Authority's new safety standards would cost another several hundred billion yen, including the expense of replacing its long-unused fuel as well as its aging components — though there would still be no guarantee that it would complete its mission of commercializing fast-breeder reactor technology.

The Abe administration may think that writing off the ill-fated costly project, even with the projected ¥300 billion cost of decommissioning the facility over 30 years, will help win more public support for its policy of seeking to reactivate the nation's conventional reactors — most of which remain idled in the wake of the 2011 meltdowns at Tokyo Electric Power's Fukushima No. 1 plant — once they've cleared the NRA screening. Public concerns over the safety of nuclear energy remain strong after the Fukushima disaster, with media surveys showing a large portion of respondents still opposed putting the idled reactors back online.

If it is going to decide to decommission the Monju reactor, however, the government should also rethink its pursuit of the nuclear fuel cycle — in which spent fuel from nuclear power plants is reprocessed to extract plutonium for reuse as fuel. Monju, which runs on plutonium-uranium mixed oxide (MOX) fuel, has been a core component of the program. As Monju remained dormant for more than 20 years, the government and power companies have shifted the focus of the policy to using MOX fuel at regular nuclear power plants. The No. 3 reactor at Shikoku Electric Power's Ikata plant in Ehime Prefecture, which resumed operation in August, runs on MOX fuel. The government apparently thinks the Monju program is no longer essential to the policy.

But the nuclear fuel cycle itself has proven elusive, and some say the policy has already collapsed. It is still nowhere in sight when the nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture — another key component in the program and whose construction began in 1993 — will be ready for operation.

After its scheduled completion in 1997 has been delayed by more than 20 times due to a series of technical glitches and other problems, its construction cost has ballooned three times the original projection to ¥2.2 trillion.

If indeed the Rokkasho facility is completed and starts reprocessing spent fuel from power plants across the country, the Ikata power plant is currently the only one in operation that consumes plutonium-uranium fuel. It's not clear how many more will be up and running in the years ahead given the slow pace of restarting the idled reactors, and the Rokkasho facility operating without a sufficient number of reactors using MOX fuel would only add to Japan's stockpile of unused plutonium — which has already hit 48 tons.

If it's the cost problem that's finally spelling doom for the Monju project, the government and power companies should also consider the cost-efficiency of the nuclear fuel cycle program, including the extra cost of reprocessing spent fuel into MOX fuel. They should also think about whether the program is compatible with the government's stated policy — though its commitment may be in doubt — of seeking to reduce Japan's dependency on nuclear power as an energy source.
Monju has drifted on for years after its future was clearly in doubt. A decision now to terminate the project seems sensible. Such a decision should also prompt the government to stop and consider whether its nuclear fuel cycle still makes sense.

September 13, 2016

Final arrangements to scrap Monju

Japan on verge of scrapping Monju fast-breeder reactor: sources

http://www.japantimes.co.jp/news/2016/09/13/national/japan-verge-scrapping-monju-fast-breeder-reactor-sources/

Kyodo
The government is making final arrangements to scrap the trouble-prone Monju fast-breeder reactor after determining it will never obtain public support for a restart, government sources said Tuesday.
The Nuclear Regulation Authority urged the education and science ministry, which oversees the reactor, in November to replace the government-backed Japan Atomic Energy Agency with a new entity to improve safety and management of the project.
In response, the ministry informed the Cabinet Secretariat earlier this month of a plan to keep operating the reactor in Fukui Prefecture by spinning off part of the project from the current operator. However, officials gave up on that plan and opted for its decommissioning after utilities and plant manufacturers showed reluctance to establish a new entity, according to the sources.
Many officials also expressed the belief that resuming ordinary reactors should be given priority.
According to the Japan Atomic Energy Agency's 2012 estimate, the cost of scrapping Monju would be around ¥300 billion over 30 years, with the expense higher than for other reactors due to its complex operating system that uses sodium as a coolant.
To restart the reactor, hundreds of billions of yen would also be needed, including a significant sum to meet the latest safety standards and annual maintenance costs of ¥20 billion.
The government has already spent more than ¥1 trillion on the Monju project, as it seeks to recycle nuclear fuel to raise the national energy self-sufficiency rate, which stood at 6 percent in 2012.
If the decommissioning goes ahead, it would require a drastic change in the nuclear fuel cycle policy, in which Monju was to play a key part.
Chief Cabinet Secretary Yoshihide Suga told a news conference that the relevant ministries and bodies are discussing the future of the reactor and that the government hopes to reach a final decision soon.
Meanwhile, the government plans to continue research and development into fast-breeder reactors, with an eye to utilizing the Joyo experimental sodium-cooled fast reactor in Ibaraki Prefecture or launching joint research with France.
A fast-breeder reactor can produce more plutonium than it consumes, and plutonium can be used as fuel for conventional and fast-breeder reactors by mixing it with uranium.
Monju has had a longtime track record of problems, starting with a major fire caused by a sodium leak in 1995. The series of problems have left it suspended much of the time since it first achieved criticality in 1994.

September 15, 2016

Scrap Monju!

EDITORIAL: Monju has run its course and should now be scrapped

http://www.asahi.com/ajw/articles/AJ201609150039.html

The government is assessing what to do about the Monju prototype fast-breeder nuclear reactor, with one option being to decommission the trouble-prone facility.

It should decide swiftly to scrap the experimental reactor in Tsuruga, Fukui Prefecture.

Monju has remained mostly idle for the past two decades or so. Restarting it would be hugely expensive. Putting the necessary safety measures in place would require an outlay of hundreds of billions of yen. The obvious solution is staring the government in the face.

Monju was designed to underpin a nuclear fuel recycling program in which plutonium extracted from reprocessed spent nuclear fuel is burned in a fast-breeder reactor. The ability to generate more fissile material than is consumed was regarded as "dream" technology.

But Monju has been mostly offline since a sodium coolant leak accident in 1995.

In 2012, it was revealed that safety maintenance checks had missed about 10,000 pieces of equipment. In response, the Nuclear Regulation Authority halted preparations to bring the reactor back online. It urged the science and technology minister last November to find a new operator for the reactor in place of the government-backed Japan Atomic Energy Agency.

The science and technology ministry has apparently been weighing plans to separate the Monju-related section from the agency and put the unit in charge of maintenance and management of the reactor.

But that would do nothing but change the name of the operator. No wonder this idea has been met with skepticism and criticism within the government.

No one in the electric power industry, which would be the primary beneficiary of the fast-breeder reactor if it ever went into practical use, is calling for early development of the technology.

That's not surprising, given that producing the necessary fuel and developing the technology to use sodium would require a huge investment in time and money.

The power industry, meanwhile, has been pushing to restart ordinary nuclear reactors, partly because uranium is now easily available and cheap.

With liberalization of the power market making their business environment much harsher, the private-sector companies have every reason to be reluctant to cheer for the Monju program.

The ministry appears to be trying to persuade the electric utilities and related manufacturers to become part of the new Monju operator. But it has been a hard sell.

More than 1 trillion yen ($9.7 billion) has been poured into the development and operation of Monju. The power industry and other private-sector players provided around 140 billion yen to cover a portion of the construction costs. But the rest of the funding for the beleaguered program has come from the pockets of taxpayers.

The fast-breeder reactor requires 20 billion yen in annual maintenance costs. The government can hardly expect to win public support for such a massive drain in taxpayer money when there is little prospect of the technology coming into practical use.

Research on fast reactor technology and radioactive waste can be accomplished--as long as safety is ensured--by using other existing facilities like the Joyo experimental fast reactor in Ibaraki Prefecture.

It is difficult to secure sufficient human resources for a plan that doesn't seem to have a viable future. There are also concerns about technology and information management and accident prevention efforts for Monju.

The troubled history of Monju clearly argues against keeping the program alive.

The establishment of a nuclear fuel recycling program itself is becoming a dead letter, and the government needs to reconsider this policy goal from scratch.
As for Monju, there is no doubt that decommissioning the reactor is the only rational choice.

September 16, 2016

Monju

LDP chief calls for decommissioning of Monju reactor

http://www.japantimes.co.jp/news/2016/09/16/national/ldp-policy-chief-calls-decommissioning-monju-reactor/#.V91SvDVdeos

JIJI
Toshimitsu Motegi, chairman of the ruling Liberal Democratic Party's Policy Research Council, on Friday called for decommissioning the Monju prototype fast-breeder nuclear reactor in central Japan as a cost-effective step for the troubled facility.
In an interview, Motegi said that he cannot think of any option other than decommissioning for the reactor in Tsuruga in Fukui Prefecture, which is operated by the Japan Atomic Energy Agency.
"Now is the time to make a decision," Motegi said.
The Monju reactor, which reached criticality for the first time in 1994, has been in operation only for 250 days so far, while more than ¥1 trillion has been spent on the reactor, a core facility for Japan's nuclear fuel cycle policy.
He also cited a failure to find a new operator of the reactor to replace the JAEA, though the Nuclear Regulation Authority urged the education and science minister to take such a step in November last year.
The JAEA is effectively banned from restarting the reactor following a series of problems, including its failure to conduct maintenance checks properly.
Motegi said hundreds of billions of yen more would be necessary for the reactor to meet the current stricter reactor safety standards for restart.
Also in the interview, Motegi said that the LDP will start discussions Tuesday on whether to extend the maximum term of office for the LDP president.
The LDP will revise its rules at a party convention next year if it reaches a conclusion on the issue by year-end at its headquarters for political system reforms, he said.
The LDP currently sets the maximum term of its president at two consecutive three-year terms. Some party members have called for allowing Abe to serve another three years to allow him to remain prime minister when Tokyo hosts the 2020 Olympic and Paralympic Games.

September 20, 2016

Monju insiders: The project is a failure

Monju fast-breeder reactor operator insiders say project is a failure: survey

http://mainichi.jp/english/articles/20160920/p2a/00m/0na/017000c

Employees of the operator of the troubled Monju prototype fast-breeder nuclear reactor in Tsuruga, Fukui Prefecture, which the government may decommission, say that the reactor is a failure or criticize the project in other ways, according to a labor union survey.

- 【Related】Gov't may finalize troubled Monju reactor's fate next week
- 【Related】Running Monju reactor for 10 years would cost gov't 600 billion yen extra
- 【Related】Editorial: Time to permanently shut down Monju nuclear reactor

A survey conducted by one of the labor unions representing workers at the Japan Atomic Energy Agency (JAEA), the results of which the Mainichi Shimbun has obtained, shows that over half of the respondents said the government should consider decommissioning the trouble-plagued reactor.
The JAEA was founded in 2005 through a merger between the Japan Nuclear Cycle Development Institute (JNC) and the Power Reactor and Nuclear Fuel Development Corp. (PNC). There are two labor unions within the JAEA -- the Japan Atomic Energy Labor Union (JAELU) comprised mainly of those who worked at PNC and Genken Roso mainly representing those employed by JNC.
Genken Roso conducted the latest survey on all 234 members between December last year and January this year after the Nuclear Regulation Authority advised the Minister of Education, Culture, Sports, Science and Technology last November to consider replacing JAEA with another body as the operator of the Monju reactor. Of its members, 71 responded. The respondents do not include workers at Monju since the union does not have a branch in Tsuruga.
JAEA employs some 3,130 workers across the country, of whom about 380 work at the Tsuruga business headquarters that supervises Monju.
According to the results of the survey obtained by the Mainichi Shimbun, some respondents wrote critical views in the survey's section in which they were asked to freely express their opinions on Monju.
"It's questionable to continue to use a massive amount of money for the reactor," one of them said.
"Monju is a failure. The reactor should be shut down after reviewing the project," another wrote.
"Fast-breeder reactors require extremely difficult technology, and it's difficult to commercialize such a project," a further respondent said.
One other employee insisted that the project should be split from the JAEA.
When asked about the future of Monju, 57.7 percent said the government should consider decommissioning the reactor while only 8.5 percent said the project should be continued under the supervision of the JAEA.
Moreover, 71.8 percent replied that they do not think the JAEA has become an organization that has never betrayed the trust of the public as a result of reforms following revelations in 2012 that the group omitted check-ups on about 10,000 items in the Monju reactor.
An official of the Genken Roso union said, "Since the response rate is low, the outcome doesn't represent the opinions of all members."
However, Fumiya Tanabe, who previously served as a senior researcher at the JAEA, pointed out that the results of the survey shows the true opinions of employees.
"The outcome shows workers' real feelings. They are also probably dissatisfied with the current situation of the organization, in which an annual 20 billion yen in taxpayers' money is injected into the idled Monju while sufficient funds can't be spent on other research projects," said Tanabe.
The JAELU's Tsuruga branch, which has 240 members, has conducted a similar survey but has withheld its results.
Commenting on the outcome of the Genken Roso survey, a JAELU official said, "Employees' enthusiasm to work hard for the future of Japan remains unchanged."

September 21, 2016

Monju: What should be done?

LDP policy chief urges scrapping of troubled Monju reactor

http://www.asahi.com/ajw/articles/AJ201609210017.html

THE ASSOCIATED PRESS

The head of the Japanese ruling party's policy council said Tuesday that the government should consider scrapping the problem-plagued Monju plutonium-breeder reactor.
Monju, designed to burn plutonium and produce more of it while generating electricity was once considered a "dream reactor" for resource-poor Japan and a centerpiece of its fuel recycling ambitions. But the 1 trillion yen ($9.8 billion) reactor has hardly operated since an accident in 1995, months after it went online. Improving its safety would require billions of more dollars and considerable time.
"It's time to make a concrete decision, including decommissioning," said Toshimitsu Motegi, the Liberal Democratic Party's policy council chairman.
His comment came one day before key Cabinet ministers related to the Monju program are to meet to reach an agreement. The ministers--including those from the industry, environment, foreign and finance ministries--are reportedly leaning toward scrapping Monju due to the huge costs of maintaining the reactor, which is now considered a white elephant.
Monju has operated only 250 days in the past 22 years, and has cost about 20 billion yen per year just to maintain the facility, said Motegi, who has served as industry and trade minister. Maintaining and upgrading the decades-old reactor to conform with new safety standards introduced after the Fukushima nuclear accident would require several hundred billion yen, he added.
Anti-nuclear sentiment has run high among the Japanese public since the March 2011 nuclear disaster at Fukushima, and there have been growing calls to close down Monju. The reactor's production of more plutonium than it uses also poses a burden on Japan, whose stockpile of plutonium reprocessed elsewhere from spent fuel is already causing international proliferation concerns.
Motegi said Japan's spent fuel recycling plan would not change without Monju.
Japan has largely switched to an alternative approach of mixing plutonium with uranium to make MOX fuel, which can be used in conventional reactors.
Last November, Japan's nuclear authority urged the science ministry, which oversees Monju, to disqualify its operator over its poor safety record or scrap the reactor. A recent ministry report failed to present a drastic reform plan or find a new operator with expertise in running the specialized reactor, which uses sodium, which is flammable, as a coolant instead of water.
Local officials in Tsuruga, Monju's location in western Japan that relies on government subsidies and employment from the project, oppose the reactor's decommissioning.
There have been discussions about using Monju for other purposes, including experimenting with fuel waste reduction.

See also:

LDP chief calls for decommissioning of Monju reactor

http://www.japantimes.co.jp/news/2016/09/16/national/ldp-policy-chief-calls-decommissioning-monju-reactor/#.V91SvDVdeos

Japan moves step closer to scrapping trouble-prone Monju reactor

http://mainichi.jp/english/articles/20160921/p2g/00m/0dm/087000c

TOKYO (Kyodo) -- The government decided Wednesday to rethink its policy on the plutonium-burning Monju fast-breeder reactor that has hardly operated over the past 20 years despite its intended key role in Japan's nuclear fuel recycling policy.

- 【Related】Decommissioning of Monju reactor would affect nuclear fuel cycle project
- 【Related】Monju fast-breeder reactor operator insiders say project is a failure: survey
- 【Related】Running Monju reactor for 10 years would cost gov't 600 billion yen extra

"Regarding the Monju project, we will fundamentally review it by the end of the year, including (the option of) scrapping it," Chief Cabinet Secretary Yoshihide Suga said during a meeting of ministers concerned, referring to the costly and trouble-prone reactor in Fukui Prefecture.
But the government is likely to remain committed to Japan's long-held policy of reprocessing uranium fuel burned in conventional reactors for reuse and to the development of fast-reactor technology.
Suga said a panel to discuss the country's fast-reactor development policy will be launched and the fate of the Monju reactor will be discussed there.
The Monju reactor is a prototype created as part of a four-stage research and development project that began in the 1960s toward commercializing fast-breeder reactors. It was once touted as a "dream reactor" for resource-poor Japan as it is designed to produce more fuel than it consumes.
The move to scrap the Monju reactor reflects a growing reluctance in Japan to continue hefty spending pursuing what had been viewed as an ideal nuclear fuel cycle, especially as nuclear power has come under intense public scrutiny in the wake of the 2011 Fukushima nuclear plant disaster. The project has already cost more than 1 trillion yen ($9.8 billion) in taxpayer money.
The problem-fraught development of Monju also led to concern over the build-up in stocks of plutonium, which the reactor was meant to burn. Plutonium is a material that can be used to make nuclear weapons.
More recently, the government has pushed a plan to burn plutonium-uranium mixed oxide fuel, known as MOX fuel, in conventional reactors as a way to consume plutonium, yet that plan too has not proceeded as expected amid safety concerns.
According to sources close to the matter, the government is likely to opt to continue fast-reactor development, such as by using the Joyo experimental reactor in Ibaraki Prefecture created as the first stage of the fast breeder reactor development project.
Fast reactors refer to plutonium-fueled reactors in which the fission chain reaction is sustained by fast neutrons. Monju is intended to be a fast reactor for plutonium "breeding," meaning that it could produce more plutonium than it consumed.
Japan may also consider partnering with France to develop a fast reactor, the sources said.
Monju has remained largely offline since first achieving criticality in 1994, due to a leakage of sodium coolant and other subsequent problems.
The reactor had only been operational for 250 days before the Fukushima nuclear power plant disaster was triggered by a huge earthquake and tsunami in March 2011. That catastrophe forced the government to review its energy policy.
Revelations of a massive number of equipment inspection failures in 2012 and continuing blunders also took a toll, leading a nuclear regulatory body newly created after the Fukushima crisis to conclude last November that the operator, the Japan Atomic Energy Agency, is not qualified to safely operate the reactor.
However, the science ministry overseeing the Monju project failed to find a new operator. The ministry then proposed a different idea for its continued operation, but the government is leaning toward scrapping it, partly because of the heavy cost of restarting it.
The Ministry of Education, Culture, Sports, Science and Technology has estimated it will require at least 580 billion yen to restart the reactor, including funds needed to upgrade the facilities to meet new safety requirements introduced after the Fukushima disaster.
That figure is based on the assumption that it would take about 10 years to complete the work to refurbish the facilities, and another five or six years to accumulate data by running the reactor.

Monju program to be drastically reviewed

http://www3.nhk.or.jp/nhkworld/en/news/20160921_06/

The Japanese government plans to hold on Wednesday a meeting of concerned Cabinet ministers to discuss the future of an experimental reactor in Fukui Prefecture.

The prototype Monju fast-breeder reactor has had a series of safety management problems.

It is believed that officials recognize a need to continue a program to develop a fast-breeder reactor. But for Monju, they are expected to confirm a policy to drastically review its operation, including possibly decommissioning it.
Following a recommendation by the Nuclear Regulation Authority, the education and science ministry, which holds jurisdiction over Monju, was supposed to pick a new operator to replace the Japan Atomic Energy Agency currently operating the experimental reactor.
But no new operator has been named yet.

Against this background, Chief Cabinet Secretary Yoshihide Suga, education and science minister Hirokazu Matsuno, Economy, Trade and Industry Minister Hiroshige Seko and other concerned ministers are to have a meeting at the prime minister's official residence on Wednesday. They are expected to discuss what should be done about Monju, and about the future of the program to develop a fast-breeder reactor.

They are expected to confirm the need to set up a new government panel to discuss the policy for fast-breeder reactor development.

Maintenance of Monju costs about 200-million dollars annually. If it is to be kept in operation, an additional several billion dollars would be needed to make the reactor more earthquake-resistant.

The Cabinet members are likely to confirm the policy to drastically review the Monju program. Some members of the government and the ruling coalition are negative about keeping Monju in operation.

The government officials hope, by the end of this year, to come up with a conclusion about what to do with Monju and the policy for the future development of a fast-breeder reactor. But they plan to have careful debates on the matter **because the education and science ministry as well as Tsuruga city, which hosts Monju, want the reactor program to be continued.**

Gov't to discuss fate of Monju reactor, option of scrapping eyed

http://mainichi.jp/english/articles/20160921/p2g/00m/0dm/016000c

TOKYO (Kyodo) -- The government is set to discuss later Wednesday whether to rethink its pursuit of the costly and trouble-plagued Monju fast-breeder reactor that was tasked with playing a key role in Japan's nuclear fuel recycling policy.
The outcome of the discussion is expected to be announced following a meeting of Cabinet ministers concerned, which could include the option of scrapping Monju -- once touted a "dream reactor" in the resource-poor country as it can produce more fuel than it consumes. But the reactor in Fukui Prefecture has hardly operated over the past 20 years.
The possible conclusion to close Monju can be seen as the latest sign of the faltering fuel recycling policy, in which Japan seeks to reprocess spent fuel and reuse plutonium and uranium, extracted through reprocessing, as plutonium-uranium mixed oxide fuel.
The commercialization of Monju had also been awaited because it consumes the so-called MOX fuel that contains plutonium, a material used in nuclear weapons. But prospects have remained dim and

the government has pushed for plans to burn MOX fuel in conventional reactors, yet the plan has also not proceeded as expected.
Monju has remained largely offline since first achieving criticality in 1994, due to a leakage of sodium coolant and other subsequent problems. The government has spent more than 1 trillion yen ($9.8 billion) for the project.
The reactor had only been operational for 250 days before the Fukushima Daiichi nuclear power plant crisis began in March 2011, which forced the government to review its energy policy amid heightened public concerns over nuclear safety.
Revelations of a massive number of equipment inspection failures in 2012 and continuing blunders further took a toll, leading a nuclear regulatory body newly created after the Fukushima crisis to conclude that operator Japan Atomic Energy Agency is not qualified to safely operate the reactor.
But the science ministry overseeing the Monju project failed to find a new operator for it. The ministry then sought its survival by proposing a different idea, but sources close to the matter have said the government is leaning toward a decision to scrap it.
The Ministry of Education, Culture, Sports, Science and Technology has also estimated it will require at least about 580 billion yen to restart the reactor, including funds needed to upgrade the facilities to meet new safety requirements introduced after the Fukushima crisis.
The figure is based on the assumption that **it needs about 10 years to complete the work to refurbish the facilities and another five to six years to take necessary data by running the reactor.**

Monju: Follow-up

Setback for Monju after years of trouble

http://www3.nhk.or.jp/nhkworld/en/news/20160921_36/

Problems at Japan's prototype Monju fast-breeder reactor have set back the country's nuclear fuel recycling program.

The fast-breeder program, once called a core for spent fuel reuse, is now a minor part of Japan's energy plan.

Japan has aimed to extract plutonium from spent nuclear fuel for reuse since it began commercial nuclear power operation after World War Two.

The program centered on fast-breeder reactors, which were called the mainstream of future reactors and an answer to a resource shortage in Japan's long-term energy plan.

Experimental operation of Monju began in 1994. But after a sodium coolant leak the following year and an attempt by the reactor's operator to hide a video of the accident site, operation of the facility was suspended.

It was restarted in 2010. But just 3 months later, a device weighing more than 3 tons fell in the reactor.

In 2011, the accident at the Fukushima Daiichi nuclear plant took place.

Monju suffered more safety problems, including inspection oversights involving up to 10,000 items.

As a result, the use of fast-breeder reactors was left out of the government's energy plan for 2014. It only referred to their role in helping reduce nuclear waste.

Background of Monju program review

http://www3.nhk.or.jp/nhkworld/en/news/20160921_35/

The government apparently decided to review the Monju fast-breeder reactor program due to reasons including mounting costs for its restart and lack of a proper operator.

Nearly 10 billion dollars has been spent on Monju since the start of the program to develop a so-called dream reactor that would produce more fuel than it takes in. But the reactor has operated for just 250 days in the past 22 years.

To go back online, Monju would have to clear government requirements put in place after the 2011 Fukushima Daiichi accident. That would take several years.

Another several billion dollars would be needed for earthquake-resistance work and maintenance.

Some government officials and ruling party members are skeptical about winning public support for such huge spending.

In addition, Japan's nuclear regulators recommended finding a new operator for Monju to replace the Japan Atomic Energy Agency.

But power industries have refused to take the job, citing lack of technological know-how and the need to focus on restarting their conventional reactors.

But decommissioning Monju would not be cheap either. The agency estimated in 2012 that a 30-year plan to scrap the reactor would cost nearly 3 billion dollars.

Govt. may scrap Monju program

http://www3.nhk.or.jp/nhkworld/en/news/20160921_34/

The Japanese government says it will drastically review its program for the troubled Monju prototype fast-breeder reactor, including possibly scrapping it.

The experimental reactor in Fukui Prefecture has had a series of safety problems. It has run just 250 days since its launch in 1994.

The science ministry overseeing the Monju program has yet to name a new operator despite a request from the regulator. The Nuclear Regulation Authority recommended the government replace the current operator, the Japan Atomic Energy Agency.

On Wednesday, the government held a meeting of related ministers to discuss the future of the Monju.

They included Chief Cabinet Secretary Yoshihide Suga, science minister Hirokazu Matsuno, economy

and industry minister Hiroshige Seko. They agreed to reach a conclusion on Monju by the end of this year.

The ministers also affirmed advancing the nuclear fuel recycling policy to promote reuse of spent fuel from nuclear power stations.

The ministers also agreed to stick to research and development for fast reactors, and set up a panel, led by Seko, to discuss forging a fresh policy on those goals of fast reactors. They aim to compile the plan by the year-end.

The ministers cited changes of circumstances, including new government regulations after the 2011 Fukushima Daiichi accident and recently-kicked off cooperation with France for the fast reactors' development.

Fast reactors are similar to Monju in using plutonium for fuel and fast neutrons for nuclear fission. But they are not designed to produce more plutonium than they consumed.

Chief Cabinet Secretary Suga asked the ministers to carefully explain the matter to local communities.

Industry minister Seko told reporters that the government will invite private companies to discuss the project. Seko referred to a fast reactor being developed in cooperation with France, as well as a possible restart of an experimental Joyo fast reactor in Ibaraki Prefecture as examples. He said the government will bring together a wide range of knowledge.

Japan's nuclear fuel project: What future?

Decommissioning of Monju reactor would affect nuclear fuel cycle project

http://mainichi.jp/english/articles/20160921/p2a/00m/0na/013000c

The government's decision to consider decommissioning the trouble-plagued Monju prototype fast-breeder reactor, because the state can no longer shoulder the heavy financial burden, will inevitably affect the nuclear fuel cycle project, in which spent nuclear fuel is reprocessed and reused.

- 【Related】Gov't to discuss fate of Monju reactor, option of scrapping eyed
- 【Related】Monju fast-breeder reactor operator insiders say project is a failure: survey
- 【Related】Editorial: Time to permanently shut down Monju nuclear reactor

A source close to the government lamented that the government's efforts to coordinate views over whether to continue the Monju project hit a snag as the Education, Culture, Sports, Science and Technology Ministry stuck to the continuation of the Monju project.
"Officials at the Education, Culture, Sports, Science and Technology Ministry only said, 'It'd be a problem if Monju were to be scrapped,' but failed to do anything. What has the ministry done so far?" the source said.
The dispute started when the Nuclear Regulation Authority (NRA) advised the ministry in November 2015 to replace the government-backed Japan Atomic Energy Agency (JAEA) with a new entity as the operator of the fast-breeder reactor.
The technology ministry considered a new organization to operate Monju on the assumption that the reactor would be maintained. The ministry set up a study panel comprised of experts and compiled a report on the issue before the May 2016 deadline set by the NRA.

However, the report stopped short of specifying a new operator but only mentioned the requirements that a new operator must meet.
Based on the report, the ministry explored the possibility of splitting the division that operates and manages Monju from the JAEA and setting up a new corporation to take over the role with cooperation from the private sector, including power companies.
However, businesses have expressed a reluctance to cooperate with such a plan.
A high-ranking official of the Economy, Trade and Industry Ministry, which is responsible for energy policy, coolly reacted to the proposal shown by the technology ministry, which had failed to show an outlook for replacing the Monju operator even after the deadline set by the NRA. "Such a plan would never have been accepted," the official said.
After the technology ministry's study panel issued the report, calls within the industry ministry urging that Monju be decommissioned began to gain momentum.
The senior industry ministry official explained, "If Monju were to be retained, it could spark criticism of the entire nuclear fuel cycle project, which would adversely affect our duty to develop fast breeders and restart idled nuclear power plants."
Monju, which is the core of the government's nuclear fuel cycle project, is a prototype reactor to conduct tests aimed at putting fast-breeder reactors into practical use, and comes under the jurisdiction of the technology ministry. However, the industry ministry is responsible for establishing fast reactor technology aimed at commercializing such a reactor.
Those calling for decommissioning Monju mainly cite the massive amount of costs to maintain the reactor.
According to government sources, Monju needs to meet the new regulatory standards established by the NRA following the crisis at the tsunami-hit Fukushima No. 1 Nuclear Power Plant before the prototype fast-breeder reactor can be restarted. Specifically, drastic refurbishment work on the reactor, including reinforcement of the facility to make it quake resistant, must be conducted.
Furthermore, a factory in the Ibaraki Prefecture village of Tokai, which produces fuel for Monju, also needs to be drastically refurbished. Experts say it would take at least 10 years and cost taxpayers an additional amount of some 580 billion yen to restart the reactor.
As for the reason for aiming to maintain Monju at such huge costs, the technology ministry claimed, "Data gained from operating Monju can be used to build a next demonstration reactor, and is necessary to seamlessly continue the nuclear fuel cycle project."
However, the industry ministry dismissed the claim. "The costs of maintaining Monju would be almost equal to the costs of building a new demonstration reactor. Since the design of Monju is old, there is no need to spend such a huge amount of taxpayers' money to maintain the reactor," an industry ministry official said.
The Cabinet Secretariat played a key role in efforts to coordinate between the two ministries, but the ministries remained at odds over the matter.
However, the convening of an extraordinary Diet session on Sept. 26 was drawing near while the technology ministry failed to show a breakthrough.
A top official in the administration of Prime Minister Shinzo Abe insisted that the executive branch should clarify its position on Monju before the extraordinary Diet session to avoid being grilled by opposition parties over the issue during deliberations.
The Cabinet Office, which is dominated by bureaucrats loaned from the industry ministry, overwhelmed the technology ministry and began considering decommissioning the reactor.
Even if the government decides to decommission Monju, it intends to continue the nuclear fuel cycle project, in which uranium and plutonium extracted from spent nuclear fuel is reused.
Officials are aiming to build a next demonstration reactor and eventually commercialize the nuclear fuel cycle project by using the Joyo demonstration reactor in the Ibaraki Prefecture town of Oarai, which is older than Monju, or conducting joint research with France at ASTRID, a new fast breeder that France is planning to build. However, there are no prospects of breaking the deadlock in the fuel cycle project.

Under the basic energy plan, which the Cabinet approved in June 2010, a new demonstration reactor would be activated by 2025 and the first reactor for commercial use be put into operation by 2050. However, the schedule was effectively scrapped following the outbreak of the Fukushima nuclear crisis. The industry ministry and other government bodies will reschedule the plan, but the project will inevitably be greatly delayed.
Regarding the use of ASTRID, critics within the government say it is difficult to establish Japan's own nuclear fuel cycle technology by relying heavily on overseas technology.
If fast-breeder reactor technology can not be put into practical use in the foreseeable future, the core of the nuclear fuel cycle project would turn to the use of mixed-oxide (MOX) fuel consisting of reprocessed plutonium and uranium. However, it remains to be seen if the project will progress steadily.
The Federation of Electric Power Companies of Japan had planned to use MOX fuel in 16 to 18 commercial nuclear reactors across the country, but the plan is being delayed in the aftermath of the nuclear disaster. The No. 3 unit at Shikoku Electric Power Co.'s Ikata plant in Ehime Prefecture is the only nuclear reactor that uses such fuel.
Operations at Oma Nuclear Power Plant in Aomori Prefecture, which can run solely on MOX fuel, are expected to begin in fiscal 2024, two years later than initially planned. As a result, how Japan should consume surplus plutonium will pose a challenge to the international community.
Nevertheless, the government is sticking to the nuclear fuel cycle project partly because of the Japan-U.S. agreement on peaceful uses of nuclear energy, which allows Japan to reprocess spent nuclear fuel. The accord is expected to be automatically renewed when it expires in July 2018. However, if Monju, which is supposed to consume a great deal of MOX fuel, is to be decommissioned and little progress is made on the consumption of MOX fuel in atomic power stations in Japan, Washington could voice opposition to automatically renewing the bilateral agreement.
Japan has so far stockpiled 47.9 metric tons of surplus plutonium both in the country and overseas. It remains to be seen how the next U.S. administration, which will be formed following the November presidential election, will respond to the matter.
"The decommissioning of Monju is separate from the nuclear fuel cycle project," stressed a senior official of the Economy, Trade and Industry Ministry as he insisted that Monju be split from the fuel cycle project.

September 22, 2016

Monju will be decommissioned

Japan to put 1-trillion-yen Monju reactor out of its misery

http://www.asahi.com/ajw/articles/AJ201609220039.html

Japan will decommission the Monju prototype fast-breeder reactor, a “dream” project that was supposed to help resolve the nuclear waste problem but has only burned money and caused nightmares for safety inspectors.
However, the government will stick with its nuclear fuel recycling efforts, including possible joint research with France on a “fast reactor” centered on consuming plutonium.
A formal decision to abandon the fast-breeder project is expected after talks with officials in Tsuruga, Fukui Prefecture, host of the Monju reactor, and in the Fukui prefectural government.

Cabinet members involved in nuclear power-related matters, including Chief Cabinet Secretary Yoshihide Suga, Hirokazu Matsuno, science and technology minister, who oversees the Monju project, and Hiroshige Seko, industry minister in charge of the nation's energy policy, agreed on Sept. 21 to unplug the Monju reactor.
"We will make a radical review, including decommissioning, of Monju by year-end," Suga said at the meeting.
Monju was seen as a pillar of Japan's nuclear fuel recycling program because it is designed to burn plutonium retrieved from huge stockpiles of spent fuel produced at nuclear power plants. Fast-breeder reactors are also supposed to produce more plutonium than they burn while generating power.
But Monju has operated on only 250 days over more than two decades because of many accidents, including a sodium coolant leak at the reactor in December 1995.
Still, the government has poured about 1.04 trillion yen ($10.29 billion) into the Monju project through the current fiscal year--588.6 billion yen on construction and 452.4 billion yen on operations and upkeep.
The annual maintenance cost for the prototype reactor is around 20 billion yen.
Upgrading the Monju reactor for the stricter safety standards set after the 2011 Fukushima nuclear disaster would cost an estimated 800 billion yen.
"It is ant lion pit rather than a swamp," a senior Finance Ministry official said, describing Monju operations as an inevitable descent toward disaster compared with a possible chance to escape.
The use of sodium as a cooling agent instead of water required extreme caution for operations of the Monju reactor.
But the Japan Atomic Energy Agency, operator of Monju, has been repeatedly warned about its slipshod management.
The Nuclear Regulation Authority, the government's nuclear watchdog, halted preparations for a resumption of Monju operations in May 2013 after the agency was found in 2012 to have failed to conduct proper safety checks on about 10,000 pieces of equipment.
Even after the agency submitted a reform plan to the NRA, new violations were found during safety inspections of the reactor.
"It could cause another accident," an NRA commissioner said, referring to the agency and its abysmal track record.
The agency was seen as so inept that the NRA in November 2015 recommended to the science and technology minister that Monju needed a new operator.
However, the ministry could not find a replacement. Few in the nuclear industry came forward to take over the problem-plagued project.
At the Sept. 21 meeting, the Cabinet ministers also agreed to set up a committee that will serve as the control tower of the fast reactor development program.
The committee is expected to comprise the industry minister, operators of nuclear power plants, the science and technology minister, and the Japan Atomic Energy Agency.

Host city, opponents react to Monju decision

http://www3.nhk.or.jp/nhkworld/en/news/20160922_01/

The mayor of Tsuruga City said on Wednesday the government's decision to comprehensively review the Monju program is deeply regrettable. The reactor is located in the city.

Takanobu Fuchikami said when he met government officials on Tuesday to ask them to keep the program alive, they told him that they'd decided nothing and that they will consider a broad range of options. He added they hold him in contempt.

Fuchikami also said the officials indicated that they will respect the opinions of host communities.

He added that when he meets science minister Hirokazu Matsuno later in the day, he wants to find out how the policy will change while officials have not disclosed the achievements of the Monju program. He suggested that Matsuno should visit the reactor.

Meanwhile, lawyers for citizens who filed a suit demanding an end to the Monju program welcomed the decision.

They urge the government to make a formal decision to scrap the reactor by the end of the year. They said the plaintiffs will continue their legal fight, but they will withdraw their lawsuit once the government decides to scrap the reactor.

A statement issued by the lawyers mentions a 2003 court decision that upheld the plaintiffs' argument that the government's approval to build the reactor is invalid. The Supreme Court later overturned the ruling.

The lawyers said the Supreme Court is hugely responsible for delaying the end of the program. They added the Supreme Court justices should reflect on what they have done.

Minister explains decision to governor

http://www3.nhk.or.jp/nhkworld/en/news/20160922_02/

Japan's science minister has explained to the governor of Fukui Prefecture about the decision to review the Monju program. The nuclear reactor is located in that prefecture.

Hirokazu Matsuno told Issei Nishikawa on Wednesday that the central government will conduct a comprehensive review of the program, which will include studying the possibility of scrapping the reactor.

Matsuno said his government will provide a sufficient explanation to the prefecture's residents who have supported the program.

Nishikawa criticized the decision as being extremely irresponsible, saying that Fukui residents feel distrust and view the government's move as betrayal.

The governor expressed doubt whether the government has fully studied the Monju program.

He added that he wonders whether nuclear fuel recycling is possible without the Monju reactor.

Monju & the "structure of irresponsibility"

EDITORIAL: Scrap not only Monju but also ‘structure of irresponsibility’

http://www.asahi.com/ajw/articles/AJ201609220026.html

In a long overdue move, the central government on Sept. 21 decided to review the Monju prototype fast-breeder nuclear reactor in Fukui Prefecture with an eye toward decommissioning.
Monju has remained mostly offline for more than two decades. Bringing it online would require hundreds of billions of yen more in safety and other measures.
It would be unpardonable to spend huge sums of additional taxpayers' money on the prototype reactor when calls for early commercialization of the technology is practically nonexistent.
The central government should tackle a mountain of unresolved problems, including providing explanations to host local governments, in steadily moving toward decommissioning Monju.
The 1 trillion yen ($9.9 billion) spent on the Monju program has delivered meager achievements.
Officials were too late in deciding to scrap the reactor.
Japan should bid farewell to the "structure of irresponsibility" that allowed the program to drag on.
The government set up a predecessor of the Japan Atomic Energy Commission and the Science and Technology Agency, now part of the education and science ministry, in 1956 to push the development of nuclear energy. In the same year, the government said in its first long-term plan: "A goal will be set for domestic production of breeder-type power reactors, mainly from the viewpoint of effective use of atomic fuel resources."
A fast-breeder reactor, which would have generated more plutonium than it burns, embodied a technology dreamed of by many nations of the world.
Monju falls in the second stage of the evolution process: from an experimental reactor to a prototype reactor to a demonstration reactor and to the final goal of a commercial reactor.
Construction began in earnest in 1985, and the first criticality was reached in 1994, but sodium coolant leaked in 1995.
Monju's operator had insisted there would be no sodium leaks, although similar accidents had occurred overseas. It tried to cover up or falsify facts to play down the damage after the leak, thereby losing confidence of society.
In the meantime, a number of other countries successively abandoned development of fast-breeder reactors, as the technological difficulties and the costliness became clearer.
When Monju was brought back online in 2010, its operator appeared to have been given an opportunity to bring forth research results. But a refueling apparatus fell into the reactor vessel soon afterward.
It was also revealed that safety maintenance checks had been skipped for as many as 10,000 pieces of equipment.
Despite the problems, Monju has been kept on "life support" at an annual maintenance cost of about 20 billion yen because outside bodies have failed to fulfill their function of conducting checks on the program.
The Japan Atomic Energy Commission, relevant ministries and agencies, and researchers in the field of nuclear power formed a single community, whereas the national Diet, whose role includes debating budgets, would not touch on the matter.
This time around, the government held a meeting of relevant Cabinet ministers to come up with the decommissioning policy. The decision deserves to be called a step forward if political circles intend to handle the matter responsibly.
But many concerns linger. The government decided to stick with its nuclear fuel recycling program and set up a new council toward developing a new fast reactor in the aftermath of Monju's decommissioning.
Such a plan runs the risk of following in Monju's footsteps.
Nuclear power administration should be acceptable to broad layers of the public. Putting Monju's decommissioning plan into practice and reviewing Japan's entire nuclear fuel recycling program should be seen as key steps toward that goal.

September 23, 2016

Monju decision: Reactions

Nuclear Watch: Reaction Mixed to Reactor Decision

http://www3.nhk.or.jp/nhkworld/nhknewsline/nuclearwatch/2016092303/

The Monju reactor was a prototype meant to be a centerpiece of Japan's nuclear power industry. But more than 2 decades and billions of dollars later, the government is looking at decommissioning it.
"We will conduct a drastic review of the Monju reactor project, including the option of decommissioning it," said Japan's Science and Technology Minister Hirokazu Matsuno.
The reactor has long been plagued with problems that have come at a hefty price. Public opinion among people who live near the reactor is mixed.
"Monju could have worked if it had been properly managed, but if the operator can't do that, there's no choice but to shut it down," said one local resident.
"I think it is better to have Monju for our local economy," said another.
The Monju reactor was meant to play a key role in Japan's nuclear fuel cycle. It's a fast-breeder reactor that's designed to generate electricity while producing more fuel than it consumes. What's more, plutonium in spent fuel from conventional nuclear power plants could be used as fuel in the reactor.
That was the theory, but the reality is that more than 10 billion dollars has been spent on building and operating the prototype reactor. And since trial operations started in 1994, it's only been in operation for 250 days.
Trouble started right away. In 1995, a leak of sodium used to cool the reactor led to operations being halted. In 2010, they started test runs again and ran into another accident. A piece of equipment weighing over 3 tons fell into the reactor, putting an end to the tests. Last November, nuclear regulators said the operator was unfit, citing the discovery of 10,000 safety oversights.
Even with all the headaches, the local governor is against what the government is trying to do.
"The decision is extremely irresponsible. I have to say that Fukui residents feel distrust," said Fukui Governor Issei Nishikawa.
Nishikawa doesn't think the government has fully studied the issue. He said he wonders whether the nuclear fuel cycle is possible without the Monju reactor. What's more, decommissioning Monju is expected to cost 3 billion dollars.
Meanwhile, the government is considering working with France on developing a new more advanced version of the Monju reactor. The hope is that it would be more successful than the current model, but they need to prove it's feasible.

Forget nuclear fuel cycle project

Editorial: Gov't should admit nuclear fuel cycle project has failed

http://mainichi.jp/english/articles/20160923/p2a/00m/0na/013000c

The government has decided to carry out a fundamental review of the fate of the Monju prototype fast-breeder nuclear reactor in Tsuruga, Fukui Prefecture, operated by the Japan Atomic Energy Agency (JAEA), with an eye to eventually decommissioning the troubled reactor. The government will make a final decision on the matter by the end of this year after consulting with concerned local governments.

- 【Related】Japan moves step closer to scrapping trouble-prone Monju reactor

Over 1 trillion yen in taxpayers' money has been invested in Monju. However, operations at the reactor have almost completely been suspended for more than 20 years because of a series of accidents and other problems. Hundreds of billions of yen would reportedly be needed to restart Monju. Still, there are no prospects that the operation of the reactor would produce any results. It is only natural, therefore, that the government intends to decommission the reactor. At the same time, the government's responsibility for repeatedly delaying a decision on the fate of the trouble-plagued reactor should be seriously called into question.

The government has promoted the nuclear fuel cycle project, in which plutonium extracted from spent nuclear fuel is mixed with uranium to produce mixed oxide fuel, or MOX fuel, to be used at nuclear reactors, as part of national policy. A fast-breeder reactor, which produces more plutonium than that consumed, is the core facility of the nuclear fuel cycle project along with a spent nuclear fuel reprocessing plant.

We cannot help but raise serious questions over a decision that the government made at a recent meeting of Cabinet ministers concerned with nuclear energy policy to continue the nuclear fuel cycle project and research and development of fast reactors, while moving toward decommissioning Monju. There are numerous challenges to putting the nuclear fuel cycle into practical use from the viewpoints of technology, economic efficiency and security. The completion of a nuclear fuel reprocessing plant, under construction in the Aomori Prefecture village of Rokkasho, has been repeatedly postponed. Doesn't the government's latest decision reflect its true intention to scrap the Monju reactor -- the core facility in the nuclear fuel cycle project -- in a bid to deflect criticism against continuing the already failed project?

The government claims that plutonium extracted from spent nuclear fuel in the cycle project should be regarded as semi-domestically produced energy, and would contribute to energy security. However, continuing the nuclear fuel cycle project means that Japan would remain dependent on atomic power in the country's energy policy.

One of the lessons learned from the Fukushima nuclear crisis is that there are high risks involving a quake-prone country relying on nuclear power. Japan needs to phase out atomic power. The government should take the opportunity to decommission Monju and put an end to the nuclear fuel cycle project.

Monju uses liquid sodium, which is flammable if exposed to air or water, as coolant. Its maintenance requires more advanced technology than conventional reactors that use water as a cooling agent. Monju has hardly been operated since a sodium leak accident in December 1995. Nevertheless, approximately 20 billion yen is spent on maintenance of the reactor each year.

It came to light that JAEA failed to inspect many parts of Monju, prompting the Nuclear Regulation Authority (NRA) to advise the reactor's regulator, the Education, Culture, Sports, Science and Technology Ministry, in November 2015 to replace the JAEA with another body as the operator of the reactor.

In response, the ministry has proposed to set up a new entity to operate Monju with cooperation from the private sector including power companies. However, major utilities have no intention of playing a key role in operating such a body amid intensifying competition in the industry following deregulation of the power market.

Furthermore, the Monju reactor must meet the new regulatory standards, which the NRA set after the outbreak of the Fukushima nuclear disaster, before being restarted. The government estimates that some 580 billion yen would be needed for work to remodel the reactor, such as reinforcement of the facility to make it quake-resistant. A huge amount of additional costs have also fueled calls for scrapping the reactor.

After Monju is shut down, the focus will be on how to consume plutonium extracted by reprocessing spent nuclear fuel. Japan has already stockpiled about 48 metric tons of surplus plutonium both in the country and overseas, including that generated as a result of commissioning British and French entities to reprocess spent nuclear fuel. This is despite the fact that the Japanese government has

repeatedly pledged to the international community that it will never possess surplus plutonium to prevent such a substance from being used by terrorists or converted to nuclear weapons.
The Federation of Electric Power Companies of Japan had worked out a plan to use MOX fuel at conventional nuclear power plants and intended to introduce such fuel to 16 to 18 reactors across the country. However, the plan was scrapped after the outbreak of the Fukushima nuclear crisis.
Currently, the No. 3 reactor at Shikoku Electric Power Co.'s Ikata plant is the only reactor using MOX fuel, and much of the surplus plutonium has not been used as planned.
The government intends to continue research and development of fast reactors in cooperation with a French organization at ASTRID, a new fast breeder that France is planning to build. However, there is no guarantee that the ASTRID project will progress smoothly.
In fact, the assessment of the nuclear fuel cycle project, which the government's Japan Atomic Energy Commission made following the outbreak of the nuclear disaster, shows it is more economically efficient to directly dispose of spent nuclear fuel than reprocessing such waste.
Japan, despite being a non-nuclear power, can reprocess spent nuclear fuel under the Japan-U.S. agreement on peaceful use of nuclear energy that went into force in 1988. The accord is set for renewal in 2018. It remains to be seen, however, as to how the next U.S. administration, to be launched following the November presidential race, will respond to the issue.
In the meantime, the biggest challenge to reviewing the nuclear fuel cycle project perhaps is how to deal with local bodies that have hosted relevant facilities.
Local governments that host Monju are urging the government to retain the prototype reactor. Aomori Prefecture, where the reprocessing plant is situated, has agreed that spent nuclear fuel would be brought into the facility on the assumption that the nuclear fuel cycle project is promoted. If the project was to be abandoned, Aomori Prefecture could end up being a nuclear waste dump site, but power companies cannot easily take over spent nuclear fuel, either.
The government should exercise wisdom to solve these problems rather than insisting on continuing the nuclear fuel cycle project.

September 25, 2016

Monju: How does it work?

News Navigator: How does the Monju fast-breeder nuclear reactor work?

http://mainichi.jp/english/articles/20160924/p2a/00m/0na/023000c

The Japanese government is moving toward decommissioning the Monju prototype fast-breeder nuclear reactor in Tsuruga, Fukui Prefecture. The Mainichi answers common questions readers may have about what kind of reactor Monju is, and the state of international research on other fast-breeder reactors.
Question: The Monju reactor is supposedly a power generating device, but how does it work?
Answer: The reactor uses one of three high-speed neutrons that are released when plutonium-239 undergoes nuclear fission, causing more plutonium-239 to undergo nuclear fission and creating heat. The other two neutrons are collided with uranium-238 -- which is not usable by normal nuclear reactors -- to create more plutonium-239. The reactor is called a "fast-breeder" because it uses "fast" neutrons to "breed" more nuclear fuel.
Q: What were the original research objectives at Monju?
A: Generally, the development process of fast-breeder reactors is to create an experimental reactor followed by a prototype reactor, a testing reactor and then a practical-use reactor. Monju is at the second of these stages. Its research objectives included improving nuclear safety and reducing nuclear waste.

Q: What are other countries' fast-breeder reactor programs like?
A: There are few countries that are actively involved in this kind of research. One example is Russia, which has been running its prototype reactor "BN-600" since 1980 and in 2015 it began power production at a testing reactor called "BN-800." Russia aims to have a practical-use reactor by around 2030. Meanwhile, since 2011, China has been generating power at its testing reactor "CEFR," and it is also aiming for a practical-use reactor by around 2030. India also planned to start a prototype reactor this year, but its plan has fallen behind schedule.
Q: What about in developed countries?
A: France is planning to begin running a reactor called ASTRID around the year 2030. However, rather than producing nuclear fuel, this reactor is primarily aimed at shortening the radioactive life of nuclear waste products, recovering resources and otherwise dealing with the issue of nuclear waste. France is aiming for commercial operation of the reactor in the 2040s.
On the other hand, the United States, after putting its prototype reactor development plans on indefinite hold in 1977 due to concerns about costs and nuclear proliferation, canceled its fast-breeder reactor plans. In 1991, Germany canceled its construction of a prototype reactor, partially due to financial difficulties. In 1994, the United Kingdom shut down its prototype reactor as well.
Fast-breeder reactors use sodium for cooling, which reacts violently when exposed to water or air, making it difficult to handle, and accidents have occurred. Another point against fast-breeder reactors is that for the time being there is little concern that uranium used for fuel at nuclear plants will run out, reducing the need for creating more nuclear fuel. (Answers by Shuichi Abe, Science & Environment News Department)

October 4, 2016

Monju stills raises many fundamental questions

Nuclear cash cow Monju now a liability for residents as plant faces ax

http://www.japantimes.co.jp/news/2016/10/04/national/nuclear-cash-cow-monju-now-liability-residents-plant-faces-ax/#.V_PmH8ldeos

by Eric Johnston
Staff Writer

KYOTO – In February 1983, Mayor Koichi Takagi of Tsuruga, Fukui Prefecture, spoke to residents in the town of Shiga, Ishikawa Prefecture, who were hoping the town would be chosen as the site for a new nuclear power plant.
Tsuruga already hosted two conventional reactors and, just a couple weeks before Takagi's visit to Shiga, preparations began for the construction of a new fast-breeder reactor called Monju, named after the bodhisattva of wisdom. An old Japanese saying goes: "out of the counsel of three comes the wisdom of Monju," meaning that, by putting their heads together, even those of ordinary intelligence can think up an idea as good as one from Monju.
Takagi, who also served as head of a nationwide group of mayors whose towns and villages hosted nuclear plants, had some sage advice for his audience. He said nuclear plants were a cash cow and that the media just sensationalized reports of mishaps.
Thirty-three years later, the Monju plant appears heading for the scrap heap. Its history has been one of controversy and scandals, including a 1995 sodium leak and fire, and subsequent cover-up attempt. Last month, the government decided on an overhaul of the Monju project, looking to decommission the idle facility.

Tsuruga is unhappy that the cash cow, which meant billions of yen to the local economy over the decades, is drying up, while the central government faces questions about the entire future of Japan's nuclear fuel cycle program.
Monju began as a policy decision made nearly a half century ago in reaction to what was seen as a worldwide problem in the conventional nuclear industry, a scarcity of uranium for conventional nuclear plants.
"According to the industry vision of the middle of the 1970s, plutonium-fueled breeder reactors were supposed to replace uranium-fueled light water reactors in order to save what was thought to be scarce natural uranium resources in a world with rapidly expanding nuclear power programs," said Mycle Schneider, a Canada-based nuclear energy consultant.
"The International Atomic Energy Agency then forecasted over 4,000 conventional reactors in the world for the year 2000. In reality, only one-tenth of the plants was built, more uranium resources were identified, and the uranium price plunged."
Decommissioning Monju is expected to take three decades, once it finally gets under way. But a host of fundamental questions remain about not only Monju but also Japan's nuclear fuel-recycling program, in which Monju was to have played a critical role.
On a practical level, these questions begin with how much the entire decommissioning process will cost. In 2012, the Science, Education, and Technology Ministry estimated that it would require at least ¥300 billion.
But that estimate does not include how much the central government might have to spend in Tsuruga and Fukui Prefecture over the coming years on various forms of public works projects in exchange for smooth local political cooperation in scrapping Monju. Over ¥1 trillion has already been spent on the plant.
Fukui residents and politicians are sure to raise strong objections if the central government concludes the only viable option for the tons of high-level radioactive waste generated by Monju's decommissioning process is to store at least part of it within the prefecture.
With three conventional nuclear reactors in the prefecture scheduled to be scrapped by midcentury, Gov. Issei Ishikawa has warned he will not tolerate having Fukui serve as a nuclear garbage dump. He has demanded that waste generated from decommissioning be disposed of outside the prefecture.
Adding Monju to the list of reactors to be decommissioned means seeking further local cooperation. That may only come after guarantees of more central government support, in the form of tax money, to help Fukui bear the burden of the decommissioning.
Meanwhile, question marks are cast over the remainder of Japan's nuclear fuel recycling program, especially the Rokkasho Reprocessing Plant in Aomori Prefecture. However, experts say it is unlikely to get the ax anytime soon.
"Terminating Rokkasho and plutonium policy remains a long way off due to the vested interests and impacts this would have on nuclear power. But the Monju decision is a major step along that path," said Shaun Burnie, senior nuclear specialist with Greenpeace Germany, who follows Japan's nuclear power policy closely.
"In immediate terms, (Monju's decommissioning) will not impact the use of MOX fuel in light water reactors. That's more affected by the lack of operating reactors with Ikata No. 3 being the only MOX-fueled reactor operating; Rokkasho justification will be based on using MOX fuel in LWR's most particularly at Oma."
The Oma nuclear power plant in Aomori Prefecture, which is scheduled to start operating in fiscal 2024, will run 100 percent on MOX fuel.
For many in Fukui who have long opposed Monju, there are also concerns about not shutting down the entire nuclear fuel recycling program and suspicions that despite the government's policy of not possessing, manufacturing or introducing nuclear weapons, Prime Minister Shinzo Abe's government wants to keep that option open, as a diplomatic tool at least, via the fuel recycling program.
"Japan has about 48 tons of plutonium stockpiled domestically and in Europe, and we need to be careful. The plutonium could be converted into nuclear weapons, and we need to make sure it's not

used for this purpose," said Tetsuen Nakajima, abbot of Myotsu-ji, a Shingon Omuro temple in Wakasa Bay in Fukui Prefecture, and a long-time anti-nuclear activist.
Such suspicions remain because Abe has in the past said he believes the possession of "small" nuclear weapons would not violate the Constitution. Members of his Cabinet, notably Defense Minister Tomomi Inada, who is from Fukui, have also argued previously for a national debate on the matter.
Finally, experts question what the government's intentions are for a new committee on fast-breeder reactors it plans to form by year-end. The new committee will be centered in the Ministry for Economy, Trade and Industry, and the Education, Science and Technology Ministry, and will include nuclear power-related government agencies and representatives from the utilities and firms in the sector.
Keiji Kobayashi, a former nuclear physics instructor and fast-breeder expert at Kyoto University Research Reactor Institute, is a longtime opponent of Monju. He says Japan might not be done entirely with fast-breeder reactors.
"Plans for the committee include clarifying a goal on the development of a demonstration reactor and creating a detailed road (map) to achieving that goal," he said. "Does that mean another reactor will be built? There are unanswered questions about what will happen to not only Monju but the fast-breeder reactor program in general."
Kobayashi was referring to the possibility of Japan participating in France's Advanced Sodium Technological Reactor for Industrial Demonstration (ASTRID) program to develop next generation fast-breeder reactor technology via research at a demonstration reactor for research purposes.
Burnie of Greenpeace Germany says ASTRID is still in the planning stage, over budget and behind schedule, and that the prospects for it being built in France are dim. In addition, while Japan's METI backs the idea of a demonstration reactor with French cooperation, the education ministry is reportedly more skeptical, noting that France closed its Super Phoenix fast breeder reactor in 1997 after numerous accidents, including, like Monju, sodium leaks.

October 15, 2016

Decommissioning means big money. Taxpayers beware!

Fukui poised to benefit from decision to scrap Monju

http://www.japantimes.co.jp/news/2016/10/15/national/fukui-poised-benefit-decision-scrap-monju/#.WAJdL8ldeos

by Eric Johnston, Staff Writer

*Big money pull a million strings*Big money hold the prize
Big money weave a mighty web
Big money draw the flies
— Rush, "The Big Money"
Last month's announcement that the Monju experimental fast-breeder reactor in Tsuruga, Fukui Prefecture, would likely be decommissioned was an acknowledgement of what had been obvious for decades. Namely, that Monju was too fraught with technical and political problems to have ever stood a chance of success.
For Kansai, the decision brought a feeling of relief among those concerned about a plutonium-producing plant in their backyard, but a feeling of "now what?" among everyone else. No political leader in Osaka, Kyoto, Nara or Kobe either wistfully eulogized or passionately protested the

recommendation that Monju, which has cost more than ¥1 trillion, be scrapped. In Fukui, however, it was a different story.

For more than four decades, Fukui's leaders have finessed the art of extracting (extorting?) as much money from Tokyo as possible in exchange for cooperation in continuing not only Monju but also 13 commercial nuclear reactors, a concentration of nuclear power plants said to be the densest in the world.

Massive amounts of tax money were funneled into the prefecture by the Liberal Democratic Party for all sorts of uses. Some were noble (construction of modern train stations, schools, hospitals and social welfare facilities). Some were corrupt (propaganda museums that played down the risks of nuclear power, all expense-paid "study" tours to Europe's nuclear reactor towns for local residents that included sightseeing trips to Paris).

Nobody really knows how much money, directly and indirectly, went to Fukui and Tsuruga over the decades for "bearing the burden of Monju." Unofficial guesses put the figure in the billions of yen. But what has residents in Kansai, and elsewhere, concerned is how much it will cost them, in the form of future government payoffs to Fukui, to be rid of Monju.

The prefecture certainly has friends in high places looking out for its interests. Defense Minister Tomomi Inada, a favorite of Shinzo Abe, represents Fukui's 1st district. That's the one without nuclear power plants, but she's very close to those in Fukui who support them. Then there's Tsuyoshi Takagi, who served as reconstruction minister. He's from Tsuruga and represents Fukui's 2nd district in the Lower House, an area that hosts those 13 commercial nuclear reactors. In short, Fukui has powerful allies who will work hard to ensure all manner of new funding flows to the prefecture and to Tsuruga over the coming decades.

Making matters better for Fukui but worse for taxpayers elsewhere, three commercial reactors will be decommissioned over the next few decades. You can be sure Fukui politicians from the governor on down are drawing up a long wish-list of pork barrel projects they will demand the central government, as well operator Kansai Electric Power Co., fork out in exchange for consenting to each reactor's decommissioning plans — plans that might include disposing high-level radioactive waste generated by decommissioning in Fukui, over the objections of residents.

In short, **decommissioning means big money for Fukui in the years ahead in the form of subsidies, jobs and service-industry income. And not just at Monju, where the basic cost was recently estimated at ¥540 billion.**

With predictions it might cost ¥8 trillion to scrap the crippled Fukushima No. 1 nuclear power plant, and perhaps a dozen commercial reactors probably heading for the scrap heap in the next decade, Japan has entered the "age of nuclear power decommissioning."

There's big money involved that will draw a swarm of flies, especially in towns and prefectures hosting the power plants. Taxpayers elsewhere, therefore, will need to be especially vigilant and handy with the flyswatters and insect repellent.

View from Osaka is a monthly column that examines the latest news from a Kansai perspective.

October 24, 2016

Forget nuclear fuel recycling

EDITORIAL: Japan should torch hopes of fast reactor to recycle nuke fuel

http://www.asahi.com/ajw/articles/AJ201610240030.html

The government has formed a "committee for fast reactor development" following its recent decision to review the Monju prototype fast-breeder nuclear reactor in Fukui Prefecture, with an eye toward decommissioning it.

If allowed to proceed like this, the government could only repeat the same mistake even if it were to decide to scrap the Monju reactor, on which more than 1 trillion yen ($9.6 billion) has been spent.
The review should cover the entire nuclear fuel recycling program, of which Monju is a part.
The new expert panel has five members, comprising the industry minister, the science and technology minister, the president of the Japan Atomic Energy Agency, which operates Monju, the chairman of the Federation of Electric Power Companies of Japan, who is also president of Chubu Electric Power Co., and the president of Mitsubishi Heavy Industries Ltd., a nuclear reactor manufacturer.
They are representatives of central players that have promoted nuclear power development, and most of the committee's meeting was held behind closed doors.
The panel apparently has no plans to conduct a comprehensive review of the Monju program, including determining why it ended in this deadlock and questioning who should be held responsible.
It would be farcical for officials to argue that the committee, as its name indicates, will be dedicated to the development of a fast reactor.
The nuclear fuel recycling program aims at reprocessing spent nuclear fuel to extract plutonium, which will be burned in nuclear reactors. A fast-breeder reactor such as Monju, which is supposed to produce more plutonium than they burn, is a core component of that program.
Even though a fast nuclear reactor is not aimed at “breeding” plutonium, it has the same basic structure of a fast-breeder reactor. It would face the same technical challenges that stood in the way of Monju.
Some government officials have made comments suggesting a fast reactor is certain to be realized.
There is no prospect, however, for materializing a safe and economically viable fast reactor any time in the near future.
Japan is banking on joining France’s program for building an Advanced Sodium Technological Reactor for Industrial Demonstration if it decides to decommission Monju. But ASTRID still remains in the basic planning stage.
Officials say they will decide whether to build the fast demonstration reactor only on the basis of the outcome of research and development, on which more than 110 billion yen will be spent through 2019.
Even if a decision is made to build ASTRID, it is only envisaged to enter into service sometime around 2030.
France is planning to have part of its experiments conducted at Monju and elsewhere. A French government official told a team of Japan National Press Club reporters that the plan would have to be amended if Monju were to be scrapped, adding that he looked forward to Japan’s financial contributions.
Tokyo is apparently touting that everything will be fine with Japan’s nuclear fuel recycling program because of the ASTRID program, which, in fact, is full of uncertainty.
Japan already possesses 48 tons of plutonium, enough to make 6,000 nuclear bombs, at home and abroad, and the country’s urgent task is to reduce that stockpile.
Japan’s ongoing “pluthermal” (plutonium-thermal) power generation method for burning mixed oxide fuel, composed of plutonium blended with uranium, in a conventional nuclear reactor is not likely to consume the huge amount of plutonium in stock.
Given that, the government’s argument that using a fast reactor to recycle nuclear fuel is therefore the only available option is an illusion that ignores reality.
The government should give serious consideration to the fact that the United States and Britain have long abandoned their nuclear fuel recycling programs.

November 2, 2016

The slow death of fast reactors

The Slow Death of Fast Reactors

http://www.theenergycollective.com/energy-post/2392389/the-slow-death-of-fast-reactors#.WBxBSbvXaTs.facebook

by Energy Post

Generation IV 'fast breeder' reactors have long been promoted by nuclear enthusiasts, writes Jim Green, editor of Nuclear Monitor, *but Japan's decision in September to abandon the Monju fast reactor is another nail in the coffin for this failed technology. According to Green, fast reactors aren't becoming mainstream, despite the claims of nuclear lobbyists.*

Fast neutron reactors are "poised to become mainstream" according to the World Nuclear Association (WNA). But data provided by the WNA itself gives the lie to the claim.

The WNA lists eight "current" fast reactors, but one of them hasn't begun operating, and another (Monju) has just been put out of its misery. Let's say there are six 'operable' fast reactors (one isn't operating but might in the future – hence the term 'operable'). Here's the historical pattern based on WNA tables:

1976 – 7 operable fast reactors
1986 – 11
1996 – 7
2006 – 6
2016 – 6

Of course there's always tomorrow: the WNA lists 13 fast reactor projects under "active development" for "near- to mid-term deployment". But a large majority of those 13 projects – perhaps all of them – lack both approval and funding.

Fast reactors aren't becoming mainstream. One country after another has abandoned the technology. Nuclear physicist Thomas Cochran summarises the history: **"Fast reactor development programs failed in the: 1) United States; 2) France; 3) United Kingdom; 4) Germany; 5) Japan; 6) Italy; 7) Soviet Union/Russia 8) U.S. Navy and 9) the Soviet Navy. The program in India is showing no signs of success and the program in China is only at a very early stage of development."**

Japan wastes billions

The latest setback was the decision of the Japanese government at an extraordinary Cabinet meeting on September 21 to abandon plans to restart the Monju fast breeder reactor.

Monju reached criticality in 1994 but was shut down in December 1995 after a sodium coolant leak and fire. The reactor didn't restart until May 2010, and it was shut down again three months later after a fuel handling machine was accidentally dropped in the reactor during a refuelling outage. In November 2012, it was revealed that Japan Atomic Energy Agency had failed to conduct regular inspections of almost 10,000 out of a total 39,000 pieces of equipment at Monju, including safety-critical equipment.

In November 2015, the Nuclear Regulation Authority declared that the Japan Atomic Energy Agency was "not qualified as an entity to safely operate" Monju. Education minister Hirokazu Matsuno said on 21 September 2016 that attempts to find an alternative operator have been unsuccessful.

Japan has wasted around US$37 billion on Monju (US$15bn) and Rokkasho (US$22bn) and plans to continue to throw good money after bad

The government has already spent 1.2 trillion yen (US$12bn) on Monju. The government calculated that it would cost another 600 billion yen (US$6bn) to restart Monju and keep it operating for another 10 years.

Decommissioning also has a hefty price-tag – far more than for conventional light-water reactors. According to a 2012 estimate by the Japan Atomic Energy Agency, decommissioning Monju will cost an estimated 300 billion yen (US$3bn).

So Japan will have wasted over US$15 billion on the Monju fiasco. Perhaps those responsible will argue that the figure pales into insignificance compared to the estimated long-term costs of around US$500 billion arising from the Fukushima disaster.

Allison MacFarlane, former chair of the US Nuclear Regulatory Commission, recently made this sarcastic assessment of fast reactor technology: "These turn out to be very expensive technologies to build. Many countries have tried over and over. What is truly impressive is that these many governments continue to fund a demonstrably failed technology."

India has a track record of making absurd projections for both fast reactors and light-water reactors – and failing to meet those targets by orders of magnitude

Japan neatly illustrates MacFarlane's bemusement. Despite the Monju fiasco, the Japanese government wants to stay involved in the fast reactor game, either by restarting the Joyo experimental fast reactor (shut down since 2007 due to damage to reactor core components) or pursuing joint research with France.

Why would Japan continue its involvement in fast reactors? Most likely, the government has no interest in fast reactors *per se*, but giving up would make it more difficult to justify continuing with the partially-built Rokkasho reprocessing plant. Providing plutonium fuel for fast reactors was one of the main justifications for Rokkasho.

Rokkasho has been an even more expensive white elephant than Monju. Its scheduled completion in 1997 has been delayed by more than 20 times due to technical glitches and other problems, and its construction cost is now estimated at 2.2 trillion yen (US$22bn) – three times the original estimate.

Japan has wasted around US$37 billion on Monju (US$15bn) and Rokkasho (US$22bn) and plans to continue to throw good money after bad. According to the International Panel on Fissile Materials, if Rokkasho operates it is expected to increase the electricity bills of Japan's ratepayers by about US$100 billion over the next 40 years.

India's failed program

India's fast reactor program has also been a failure. The budget for the Fast Breeder Test Reactor (FBTR) was approved in 1971 but the reactor was delayed repeatedly, attaining first criticality in 1985. It took until 1997 for the FBTR to start supplying a small amount of electricity to the grid. The FBTR's operations have been marred by several accidents.

Preliminary design work for a larger Prototype Fast Breeder Reactor (PFBR) began in 1985, expenditures on the reactor began in 1987/88 and construction began in 2004 – but the reactor still hasn't started up. Construction has taken more than twice the expected period. In July 2016, the Indian government announced yet another delay, and there is scepticism that the scheduled start-up in March 2017 will be realised. The PFBR's cost estimate has gone up by 62%.

"It's very likely that the current economic crisis, the deepest in history since the USSR collapsed, will axe most of the new reactors"

India's Department of Atomic Energy (DAE) has for decades projected the construction of hundreds of fast reactors – for example a 2004 DAE document projected 262.5 gigawatts (GW) of fast reactor capacity by 2050. But India has a track record of making absurd projections for both fast reactors and light-water reactors – and failing to meet those targets by orders of magnitude.

Princeton academic M.V. Ramana writes: "Breeder reactors have always underpinned the DAE's claims about generating large quantities of electricity. Today, more than six decades after the grand plans for growth were first announced, that promise is yet to be fulfilled. The latest announcement about the delay in the PFBR is yet another reminder that breeder reactors in India, like elsewhere, are best regarded as a failed technology and that it is time to give up on them."

Russia's snail-paced program

Russia's fast reactor program is the only one that could be described as anything other than a failure. But it hasn't been a roaring success either.

Three fast reactors are in operation in Russia – BOR-60 (start-up in 1969), BN-600 (1980) and BN-800 (2014). There have been 27 sodium leaks in the BN-600 reactor, five of them in systems with radioactive sodium, and 14 leaks were accompanied by burning of sodium.

The Russian government published a decree in August 2016 outlining plans to build 11 new reactors over the next 14 years. Of the 11 proposed new reactors, three are fast reactors: BREST-300 near Tomsk in Siberia, and two BN-1200 fast reactors near Ekaterinburg and Chelyabinsk, near the Ural mountains. However, like India, the Russian government has a track record of projecting rapid and substantial nuclear power expansion – and failing miserably to meet the targets.

A far more likely scenario is that China will have 0 GW of fast reactor capacity by 2050

As Vladimir Slivyak recently noted in Nuclear Monitor: "While Russian plans look big on paper, it's unlikely that this program will be implemented. It's very likely that the current economic crisis, the deepest in history since the USSR collapsed, will axe most of the new reactors."

While the August 2016 decree signals new interest in reviving the BN-1200 reactor project, it was indefinitely suspended in 2014, with Rosatom citing the need to improve fuel for the reactor and amid speculation about the cost-effectiveness of the project.[16]

In 2014, Rosenergoatom spokesperson Andrey Timonov said the BN-800 reactor, which started up in 2014, "must answer questions about the economic viability of potential fast reactors because at the moment 'fast' technology essentially loses this indicator [when compared with] commercial VVER units."

China going nowhere fast

Australian nuclear lobbyist Geoff Russell cites the World Nuclear Association (WNA) in support of his claim that China expect fast reactors "to be dominating the market by about 2030 and they'll be mass produced."

Does the WNA paper support the claim? Not at all. China has a 20 MWe experimental fast reactor, which operated for a total of less than one month in the 63 months from criticality in July 2010 to October 2015. For every hour the reactor operated in 2015, it was offline for five hours, and there were three recorded reactor trips.

China also has plans to build a 600 MWe 'Demonstration Fast Reactor' and then a 1,000 MWe commercial-scale fast reactor. Whether those reactors will be built remains uncertain – the projects have not been approved – and it would be another giant leap from a single commercial-scale fast reactor to a fleet of them.

Russell's claim that fast reactors will be "dominating the market by about 2030" is jiggery-pokery of the highest order and the lowest repute

According to the WNA, a decision to proceed with or cancel the 1,000 MWe fast reactor will not be made until 2020, and if it proceeds, construction could begin in 2028 and operation could begin in about 2034.

So China might have one commercial-scale fast reactor by 2034 – but probably won't – and Russell's claim that fast reactors will be "dominating the market by about 2030" is jiggery-pokery of the highest order and the lowest repute.

According to the WNA, China envisages 40 GW of fast reactor capacity by 2050. A far more likely scenario is that China will have 0 GW of fast reactor capacity by 2050. And even if the 40 GW target was reached, it would still only represent around one-sixth of total nuclear capacity in China in 2050 according to the WNA – fast reactors still wouldn't be "dominating the market" even if capacity grows 2000-fold from 20 MW (the experimental reactor) to 40 GW.

Travelling-waves and the non-existent 'integral fast reactor'

Perhaps the travelling-wave fast reactor popularised by Bill Gates will come to the rescue? Or perhaps not. According to the WNA, China General Nuclear Power and Xiamen University are reported to be cooperating on R&D, but the Ministry of Science and Technology, China National Nuclear Corporation,

and the State Nuclear Power Technology Company are all skeptical of the travelling-wave reactor concept.

Superphénix was meant to be the world's first commercial fast reactor but in the 13 years of its miserable existence its 'Energy Unavailability Factor' was 90.8%. Note that the fast reactor lobbyists complain about the intermittency of wind and solar

Perhaps the 'integral fast reactor' (IFR) championed by James Hansen will come to the rescue? Or perhaps not. The UK and US governments have been considering building IFRs (specifically GE Hitachi's 'PRISM' design) for plutonium disposition – but it is almost certain that both countries will choose different methods to manage plutonium stockpiles.

In South Australia, nuclear lobbyists united behind a push for IFRs/PRISMs, and they would have expected to persuade a stridently pro-nuclear Royal Commission to endorse their ideas. But the Royal Commission completely rejected the proposal, noting in its May 2016 report that advanced fast reactors are unlikely to be feasible or viable in the foreseeable future; that the development of such a first-of-a-kind project would have high commercial and technical risk; that there is no licensed, commercially proven design and development to that point would require substantial capital investment; and that electricity generated from such reactors has not been demonstrated to be cost competitive with current light water reactor designs.

A future for fast reactors?

Just 400 reactor-years of worldwide experience have been gained with fast reactors. There is 42 times more experience with conventional reactors (16,850 reactor-years). And most of the experience with fast reactors suggests they are more trouble than they are worth.

Apart from the countries mentioned above, there is very little interest in pursuing fast reactor technology. Germany, the UK and the US cancelled their prototype breeder reactor programs in the 1980s and 1990s.

France is considering building a fast reactor (ASTRID) despite the country's unhappy experience with the Phénix and Superphénix reactors. But a decision **on whether to** construct **ASTRID will not be made until 2019/20.**

In the 1970s, breeder advocates were predicting that the world would have thousands of breeder reactors operating this decade. Today, they are predicting commercialization by approximately 2050

The performance of the Superphénix reactor was as dismal as Monju. Superphénix was meant to be the world's first commercial fast reactor but in the 13 years of its miserable existence it rarely operated – its 'Energy Unavailability Factor' was 90.8% according to the IAEA. Note that the fast reactor lobbyists complain about the intermittency of wind and solar!

A 2010 article in the *Bulletin of the Atomic Scientists* summarised the worldwide failure of fast reactor technology: "After six decades and the expenditure of the equivalent of about $100 billion, the promise of breeder reactors remains largely unfulfilled. … The breeder reactor dream is not dead, but it has receded far into the future. In the 1970s, breeder advocates were predicting that the world would have thousands of breeder reactors operating this decade. Today, they are predicting commercialization by approximately 2050."

While fast reactors face a bleak future, the rhetoric will persist. Australian academic Barry Brook wrote a puff-piece about fast reactors for the Murdoch press in 2009. On the same day he said on his website that "although it's not made abundantly clear in the article", he expects conventional reactors to play the major role for the next two to three decades but chose to emphasise fast reactors "to try to hook the fresh fish".

So that's the nuclear lobbyists' game plan – making overblown claims about fast reactors and other Generation IV reactor concepts, pretending that they are near-term prospects, and being less than "abundantly clear" about the truth.

by Jim Green

Dr Jim Green is the national nuclear campaigner with Friends of the Earth, Australia, and editor of the Nuclear Monitor *newsletter published by the World Information Service on Energy. An earlier version of this article was published in Nuclear Monitor.*

November 7, 2016

Scrapping Monju: What of radioactive sodium? What of MOX?

Scrapping of Monju would mean disposal of 760 tons of radioactive sodium, MOX fuel

http://www.japantimes.co.jp/news/2016/11/07/national/monju-scrapping-mean-disposing-760-tons-radioactive-sodium-mox-fuel/#.WCGuysmDmos

JIJI
About 760 tons of radioactive sodium remain in the piping and other equipment of the trouble-prone Monju prototype fast-breeder nuclear reactor, which may be ordered decommissioned, it was learned Sunday.
It has not been decided how to dispose of the radioactive sodium, said sources at the Japan Atomic Energy Agency, the operator of Monju. If the government decides to scrap the reactor, sodium disposal is expected to be a difficult challenge.
Sodium is used as a coolant at Monju, while water is used at conventional nuclear reactors. Sodium is a tricky chemical element that burns intensely if it comes into contact with air or water.
According to the agency, the Monju reactor has some 1,670 tons of sodium. Radioactive substances are contained in 760 tons of the total as it circulates inside the reactor vessel.
The Monju reactor needs to be drained of the sodium if it is to be demolished.
Radioactive and chemically active sodium has to be sealed in containers. There is no precedent of radioactive sodium disposal in Japan.
"We plan to consider the method of disposal if a decision is made to decommission (Monju)," an official said.
Monju, located in Tsuruga, Fukui Prefecture, is a core facility in Japan's nuclear fuel cycle policy because, if running properly, the reactor produces more plutonium than it consumes.
More than ¥1 trillion, mostly from state budgets, has been invested in Monju. But the 280,000-kw reactor has operated for only 250 days since it reached criticality, or a self-sustained nuclear fission chain reaction, for the first time in April 1994, due to a raft of problems, including maintenance flaws, a sodium leak and fire and attempted coverup.
In November 2015, the Nuclear Regulation Authority advised the government to replace the operator of Monju. The government is carrying out a thorough review of the Monju project, including the possibility of decommissioning the reactor.
The disposal of the mixed-oxide, or MOX, fuel used at Monju is another significant issue. The amount of MOX fuel, a blend of uranium and plutonium recycled from spent nuclear fuel, that needs to be disposed of is estimated at 21 tons, but Japan is not equipped to carry out its disposal.
One option is to consign the disposal to a foreign country and receive the return of uranium and plutonium after the processing, along with radioactive waste.
But the agency's cost estimate of ¥300 billion for decommissioning Monju does not include the expense of the overseas entrustment of MOX fuel disposal.
The agency aims to entrust France with the disposal of some 64 tons of MOX fuel that has been used at its Fugen advanced converter reactor, but no contract has been concluded. The Fugen reactor, also in Tsuruga, is slated to be decommissioned.

Spent MOX fuel contains larger amounts of highly toxic radioactive substances than spent uranium from conventional reactors.
The disposal of radioactive sodium and MOX fuel at Monju is emerging as an additional and difficult challenge for the government at a time when the final disposal site has not been decided for high-level radioactive waste from nuclear plants across Japan.

November 30, 2016

Final decision on Monju reactor due next month

Govt. to scrap trouble-prone fast breeder

http://www3.nhk.or.jp/nhkworld/en/news/20161130_06/

The Japanese government plans to scrap the prototype fast-breeder reactor Monju, which has been hit by a number of safety problems.

The government is set to make the final decision on the fate of the reactor in Fukui Prefecture next month.

Officials say they've obtained results and knowledge to a certain degree to develop a demonstration reactor, which is the next phase.

They also say resuming operations of Monju would cost a huge amount of money.

The officials estimate that retrieving spent nuclear fuel will take at least 5-and-a-half years, and completing the whole decommissioning work will require 30 years.

The government is considering designating the region that hosts Monju as one of the centers for research and development of fast reactors.

It also hopes to conduct studies on liquid sodium, which is used to cool fast-breeder reactors, on the sidelines of Monju's decommissioning work.

Monju has operated for just 250 days since it began operations in 1994.

It would take 8 years to restart Monju

Eight Years Needed To Restart Japan's Monju FBR, Says Minister

http://www.nucnet.org/all-the-news/2016/11/30/eight-years-needed-to-restart-japan-s-monju-fbr-says-minister

Plant Operation
It would take eight years to restart the Monju prototype fast breeder reactor (FBR) in Japan's Fukui Prefecture because of the need to respond to new nuclear regulations imposed since the March 2011

Fukushima-Daiichi accident, Ministry of Education, Culture, Sports, Science and Technology (MEXT) minister Hirokazu Matsuno said. In a meeting with Fukui governor Issei Nishikawa, Mr Matsuno put the estimated operating costs of Monju until the end of its scheduled lifetime at about $4.82bn (€4.52bn). The Japan Atomic Industrial Forum (Jaif) said the purpose of the meeting was to exchange views on the government's review of Monju, including its possible decommissioning, as well as on Japan's FBR development policy. Jaif said a decision on the Monju FBR and national FBR policy are expected at a ministerial meeting on nuclear energy to be held before the end of the year. Media reports in Japan have said the government has decided to decommission Monju, which reached criticality for the first time in 1994, but has mostly been offline since 1995. Monju is designed to use mixed fuel rods of uranium and plutonium, and to produce more fuel than it consumes. Regarded as the core facility of the government's policy for nuclear fuel recycling, Monju is different from conventional nuclear power plants, which use water as coolants. Monju uses sodium as the coolant, meaning more sophisticated technology is required for its operation.

Related reports in the NucNet database (available to subscribers):

- Japan To Establish Committee On Fast Reactor Development (News in Brief No.193, 29 September 2016)

December 1, 2016

Plutonium: Between the devil and the deep blue sea

Japan unable to scrap recycling program due to plutonium stocks

http://www.asahi.com/ajw/articles/AJ201612010089.html

Japan is caught between a rock and a hard place when it comes to pressing ahead with its dream of a perpetual energy source through nuclear fuel recycling.

Having poured hundreds of billions of yen into the failed Monju prototype fast-breeder reactor project, it is belatedly considering decommissioning the facility. But it is still left with a huge stockpile of plutonium, and no way of reducing the amount in the coming years.

Having come this far, Japan is simply not able to abandon the problem-plagued, money-guzzling technology, hence its Nov. 30 plan to build a demonstration fast reactor to replace Monju.

Unlike Monju, which uses and generates plutonium, a fast reactor only burns plutonium.

"If Japan abandoned its nuclear fuel recycling policy, it would be like opening 'Pandora's box,'" said a senior official at the Ministry of Economy, Trade and Industry, which oversees the nation's nuclear energy policy, referring to the new fast reactor program. "A project illustrating Japan's intent to continue the development of a fast reactor serves as the seal of approval."

The government's committee for fast reactor development, which is headed by industry minister Hiroshige Seko, said it expects to have the development regime in place in 2018. The following 10 years would be given over to scientists to work on the basic design of the fast reactor.

A demonstration reactor is one stage closer to a commercial reactor compared with a prototype reactor such as Monju.

Nuclear fuel recycling uses plutonium recovered from reprocessing of spent nuclear fuel generated at nuclear power plants.

Monju in Tsuruga, Fukui Prefecture, also uses plutonium as fuel. Or rather, it was supposed to. The project has come under intense criticism because it has hardly operated since it achieved criticality more than 20 years ago. The government has poured about 1 trillion yen ($8.9 billion) into Monju.

If Japan pulled the plug on the development of a fast reactor, it would jeopardize the nuclear fuel recycling program and create new problems that the government has adroitly avoided dealing with to date.
For one, all spent nuclear fuel from nuclear power plants across the country would suddenly just become “waste.”
As a result, the government would have no compelling reason to justify the storage of nuclear fuel waste at the spent nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture. The plant has yet to be completed although it was initially expected to be finished in 1997.
The government has been unable to decide where nuclear waste should be placed for permanent disposal since no municipalities in Japan want such facilities in their backyards.
And then there is the issue of Japan's stockpile of 48 tons of plutonium and being able to offer assurances to the international community that this country poses no threat to others.
The stockpile is sufficient to produce 6,000 atomic weapons.
If Japan retains the plutonium stockpile with no plan to use it in the near future after it abandons the development of a fast reactor, it could fuel international concerns that Japan may have nuclear ambitions.
The agreement between Japan and the United States concerning the civil use of atomic energy will expire in July 2018.
The pact allows Japan to recover plutonium from spent nuclear fuel on the condition that the country will not use plutonium to manufacture nuclear weapons.
If Japan holds on to the reprocessing program while scrapping the project to develop a fast reactor, it will be left with an ever-growing stockpile of plutonium.
“We cannot rule out the possibility that it could have ramifications on the revision of the agreement,” said a senior official at the Foreign Ministry with regard to the plutonium issue.
Tatsujiro Suzuki, a professor of nuclear energy at Nagasaki University and former vice chairman of the government’s Nuclear Energy Commission, expressed skepticism about taking on a new fast reactor project when scientists could elicit few tangible results about performance and operational safety from Monju.
With the government set to undertake a new reactor project, Japan is also banking on joining France’s ASTRID program to access a range of data on the operation of a demonstration fast reactor. This refers to the Advanced Sodium Technological Reactor for Industrial Demonstration.
But it is still unclear even whether the ASTRID program will ever go ahead.
“If we engaged in discussions with little transparency, the international community would come to harbor doubts about Japan’s intention concerning plutonium and lose confidence in Japan,” Suzuki said.

New Monju : a "folly not acceptable by any means"

EDITORIAL: Plan to build Monju successor is outrageously irresponsible

http://www.asahi.com/ajw/articles/AJ201612010046.html

The government at a closed meeting on Nov. 30 revealed plans to develop a demonstration fast reactor as the successor to the Monju prototype fast-breeder reactor in Fukui Prefecture, which will be decommissioned.
A totally irrational policy decision is now being made behind closed doors only by people with vested interests in the trouble-plagued Monju program.

The government is making a head-long plunge into another costly reactor project that has no solid prospects of success. The government has not scrutinized nor learned lessons from the miserable failure of the Monju program.
This behavior is outrageously irresponsible.
More than 1 trillion yen ($8.8 billion) has been poured into the development and operation of Monju, but the reactor operated for only around 220 days during the 20-plus years since it first achieved criticality in 1994.
The experimental reactor has been mostly idle because of a series of accidents and troubles, including a 1995 leak of liquid sodium used as the coolant, a material that is famously hard to handle.
In contrast, the Joyo test fast reactor, which represents the first stage of developing a practical fast-breeder reactor, has operated for a total of 3,000 days, more than 13 times longer than Monju's record.
This again shows that technological challenges involved in the development of such sophisticated new technology become far more formidable as the project moves to the later stages.
Unlike Monju, the new experimental fast reactor envisioned by the government would not be a breeder reactor that generates more fissile material--plutonium to be exact--than it consumes. But it will be based on the same fast reactor technology.
Given that even operating a prototype fast-breeder reactor has proved such a fierce challenge, there are countless reasons to doubt the viability of the government's plan to develop a cheap and safe demonstration fast reactor.
The government says it will seek international cooperation for the project. But France's Advanced Sodium Technological Reactor for Industrial Demonstration (ASTRID) program, which the Japanese government is counting on for its fast reactor project, is itself facing an unclear future. The French government is expected to decide in 2019 on whether to build the fast demonstration reactor.
The Japanese government is not even bothering to set up a proper forum for discussions on the new project.
The Nov. 30 meeting was attended by the industry minister, the science and technology minister, representatives of the Federation of Electric Power Companies, which is the power industry lobby, executives of Mitsubishi Heavy Industries Ltd., which makes nuclear reactors, and officials of the Japan Atomic Energy Agency, the operator of Monju. They are all parties involved in the Monju program.
The two officials of Japan Atomic Energy Agency who were present at the meeting are a former Mitsubishi Heavy Industries executive and a former science and technology official.
In other words, the decision-making process concerning the project is totally controlled by the interests of the government and the nuclear power industry.
Why is the government so fixated on developing fast reactor technology?
Monju has long been cast as the linchpin of a nuclear fuel recycling program in which plutonium extracted from reprocessed spent nuclear fuel is burned in a fast-breeder reactor.
Now that it has decided to decommission Monju, the government is apparently concerned that the lack of the troubled reactor's successor could cause the entire nuclear fuel recycling program to collapse, undermining its efforts to promote nuclear power generation.
Japan, however, already has a stockpile of 48 tons of plutonium, enough to make 6,000 ordinary nuclear bombs.
With no prospects of practical use of a fast reactor, Japan's fixation on establishing a nuclear fuel recycling system makes no economic sense and only raises suspicions in the international community.
The government has been roundly criticized for its obstinate adherence to nuclear power policy decisions made in the past.
But the disaster that occurred in 2011 at the Fukushima No. 1 nuclear power plant has led to broad public recognition of the importance of impartial debate on related issues not influenced by special interests or past developments.
Now, however, the government is ignoring the lessons learned from the nuclear disaster. It is seeking to make the decision in collusive meetings to spend a huge amount of taxpayer money on the highly questionable fast reactor project. This folly cannot be acceptable by any means.

December 2, 2016

New research reactor in Tsuruga

Gov't eyes new research reactor in line with decommissioning of Monju

http://mainichi.jp/english/articles/20161202/p2a/00m/0na/013000c

The government is moving ahead with arrangements to construct a new research reactor in Fukui Prefecture, in line with the decommissioning of the trouble-plagued Monju prototype fast-breeder reactor, it has been learned.

- 【Related】France wants Japan to share 570 billion yen ASTRID reactor development cost
- 【Related】Decommissioning of Monju reactor would affect nuclear fuel cycle project
- 【Fukushima & Nuclear Power】

Officials are considering placing the research reactor in the Fukui Prefecture city of Tsuruga, where the Monju reactor now stands. The Fukui Prefectural Government has asked the national government to convert the surrounding area into a base for nuclear power research. An outline of the project will be presented this month at a meeting of related Cabinet ministers, in which a final decision will also be made on the decommissioning of Monju.
It will be the first time for a research reactor to be established in Japan since the construction of the Japan Atomic Energy Agency's High Temperature Engineering Test Reactor in Oarai, Ibaraki Prefecture, which first reached criticality in 1998. There are 14 research reactors in Japan overseen by the agency and universities, but there are none in Fukui Prefecture. Only three of the 14 reactors meet new safety standards implemented in the wake of the disaster at Tokyo Electric Power Co.'s Fukushima No. 1 Nuclear Power Plant. The three reactors are overseen by Kyoto University and Kindai University.
Work to decommission reactors at the Fukushima No. 1 plant will be stepped up in the future. Meanwhile, other old reactors are being decommissioned, and officials had feared that if reactivation of idled research reactors did not progress, then there would be fewer opportunities for nuclear engineers to train, and hinder the cultivation of personnel.
The government is contemplating setting up a small reactor like the experimental research reactors of universities, and it will consider the primary contractor and other details in the future. Officials intend to push ahead with decommissioning the Monju reactor at the same time as utilizing the work for obtaining knowledge in safety research. In line with the construction of a new research reactor, the government will seek to turn the area into a base for nuclear research and personnel training.
Fukui Gov. Issei Nishikawa on Nov. 25 made a request to Minister of Education, Culture, Sports, Science and Technology Hirokazu Matsuno and Minister of Economy, Trade and Industry Hiroshige Seko to provide concrete measures to cultivate human resources in the field of nuclear power.
In a meeting of the industry ministry's Council on Fast Reactor Development on Nov. 30, officials agreed on the construction in Japan of a demonstration reactor -- the step after a prototype reactor like Monju -- by utilizing collaborative research relating to the ASTRID fast demonstration reactor that France is building, and the Joyo fast experimental reactor in Oarai.

December 19, 2016

Monju: At least 375 billion yen and 30 years

Shuttering Monju reactor to take 375 billion yen and 30 years

http://www.asahi.com/ajw/articles/AJ201612190054.html

At least 375 billion yen ($3.2 billion) will be needed over 30 years to decommission the Monju prototype fast-breeder reactor in Fukui Prefecture, according to a government estimate revealed on Dec. 19.

The mind-numbing estimate and time frame were announced by the government's committee for fast reactor development.

The committee's proposed plan is to start decommissioning from 2017 and spend five and half years removing spent nuclear fuel from the problem-plagued reactor and complete the entire process in 2047.

The government also met with Fukui Governor Issei Nishikawa at the science and technology ministry building in Tokyo later the same day and passed on its intention to decommission the Monju reactor without a restart.

At the meeting, Nishikawa met with science and technology minister Hirokazu Matsuno, and trade minister Hiroshige Seko.

Matsuno told the governor that Monju will "be transferred to the decommissioning process without being restarted."

He asked for understanding that the government will continue the development of fast reactors, which burn plutonium retrieved from spent fuel produced at nuclear power plants, and plans to construct another reactor for study purposes near the Monju reactor as a research base.

The government plans to finalize the decision to decommission Monju at a meeting of Cabinet members involved in nuclear energy policy, which is expected to be held Dec. 20 or later.

The estimated breakdown of the decommissioning costs are 225 billion yen for the maintenance cost of the facility until the completion of the process; 135 billion yen for deconstruction and other related costs; and 15 billion yen for preparation for the removal of spent fuel.

Time for gov't to come clean on Monju reactor muck-up

http://mainichi.jp/english/articles/20161219/p2a/00m/0na/017000c

On Dec. 19, the central government informed Fukui Prefecture that the Monju fast-breeder reactor would be decommissioned. In its 22-year history, Monju has cost Japanese taxpayers more than a trillion yen, and been in actual operation for a grand total of 250 days.

- 【Related】Plan to decommission troubled Monju reactor meets local criticism

Nevertheless, on the same day the government broke the news about Monju's impending end to Fukui Gov. Issei Nishikawa, it also decided internally to continue attempts to develop fast-breeder reactor technology, and all without any examination or investigation into why Monju failed in the first place.

Fast-breeder technology holds out the promise of "dream reactors" that produce more fuel than they use. However, its cost and complexity have proven too much for other would-be developers, and Britain, the United States and Germany all abandoned their own fast-breeder efforts in the 1990s.

Monju reached criticality in 1994 with high hopes that it would prove the technology's efficacy, and become the "Model T" of fast-breeder reactors.

However, the reactor suffered repeated mishaps including a 1995 sodium leak, and never surpassed 40 percent of its power output capacity. Even so, the government claims that "much technological knowledge was gained (from Monju) that can be put to use for the development of the next test reactor." That is, the government has not admitted that Monju was a failure.

Or to put it another way, no one is willing to take responsibility for the Monju money pit, and Japan's taxpayers have been stuck with the bill.

Meanwhile, the government's committee on fast-breeder development decided unanimously on Dec. 19 to pursue, in cooperation with France and using domestic facilities, the construction of a new experimental reactor. It must be pointed out, however, who sits on this august body. Joining officials from the Ministry of Education, Culture, Sports, Science and Technology and the Japan Atomic Energy Agency -- who run the Monju project -- are those from two nuclear fuel cycle boosters, the Ministry of Economy, Trade and Industry and the Federation of Electric Power Companies of Japan. Rounding out the membership is the chief of Mitsubishi Heavy Industries, which makes nuclear reactors.
The proceedings of these committee meetings -- which are, as a rule, "private" and therefore never revealed to the public -- have always been based on the presumption that the problem-plagued nuclear fuel cycle policy (reprocessing spent fuel into MOX mixed-oxide fuel) will continue.
Continuing the fuel cycle and the fast-breeder project is costing Japan enormous sums, and if in the end it fails, the Japanese people may very well end up paying for it. To prevent another Monju muck-up, the government should conduct a very public examination of exactly what went wrong.

December 20, 2016

Fast reactor future

Gap emerges between gov't, private sector over fast reactor project

http://mainichi.jp/english/articles/20161220/p2a/00m/0na/017000c

The Japan Atomic Energy Agency's Monju fast-breeder reactor is seen in Tsuruga, Fukui Prefecture, from a Mainichi Shimbun helicopter on Dec. 19, 2016. (Mainichi)
Prospects of putting fast reactors into use in Japan remain dim in spite of the government's approval of policy to continue their development with the private sector, as the power industry appears hesitant to contribute during the developmental stage.

- 【Related】Time for gov't to come clean on Monju reactor muck-up
- 【Related】Plan to decommission troubled Monju reactor meets local criticism

"We would like to build a system where the government, manufacturers, power companies and research institutions cooperate and share responsibilities in a unified manner, without building walls against each other," Economy, Trade and Industry Minister Hiroshige Seko told the government's Council on Fast Reactor Development at the outset of its Dec. 19 meeting. The committee also agreed to launch a strategic working group to draw up a road map for technology development.
The Ministry of Economy, Trade and Industry insists on continuing with the fast reactor project because officials believe that such reactors are essential in nuclear fuel cycle, in which plutonium is extracted from spent nuclear fuel to be reused. While plutonium can be used at regular nuclear plants, its main planned use is in fast reactors -- particularly fast-breeder reactors that can produce more plutonium than they spend to generate power. The development of fast-breeder reactors has therefore been characterized as a trump card to solve resource problems.
If the Monju prototype fast-breeder reactor is decommissioned, however, the government's plan will lose momentum. The collapse of the nuclear fuel cycle will bring issues pertaining to nuclear power development in Japan to the fore. For example, Aomori Prefecture accepts spent nuclear fuel from nuclear power stations across Japan on condition that plutonium extracted from the spent fuel can be reused. Once the nuclear fuel cycle emerges as a failure, such spent fuel is no longer a "resource" but "waste." And if the prefectural government tries to send the waste back to nuclear plants, it could cause major chaos.

Amid such circumstances, the Japan Atomic Energy Agency (JAEA) -- the main administrator of the Monju reactor -- has been declared disqualified from operating the troubled reactor. As a result, pressure has risen for the fast reactor project to be fundamentally reviewed.
The economy ministry came up with a scenario to involve all the interested parties, including power companies and manufacturers, in the development of fast reactors. It seems, however, that the private sector is not as keen. While Satoru Katsuno, chairman of the Federation of Electric Power Companies of Japan (FEPC) and president of Chubu Electric Power Co., told participants at the council meeting that he was ready to actively be involved in the process of clarifying the goals of technology development, an executive from a major utility revealed that electric companies cannot afford to work on the fast reactor project amid growing competition in the power market following deregulation. The official said, "We would rather work on restarting nuclear plants."
Former Tokyo Electric Power Co. executive Takaaki Masumoto, who served as the vice chairman of the FEPC, pointed out that fast reactors are "necessary in the long run" but said, "The power industry had no intention of getting directly involved in the project until the government was able to put the technology into commercial use."
For power companies, promotion of the nuclear fuel cycle hinges on the central government taking responsibility for research and development of the technology, and the private sector being able to operate fast reactors for commercial use. The government had initially tapped the private sector to find a replacement for JAEA as the main operator of the Monju reactor, but power companies refused to take on the role.
Meanwhile, nuclear reactor manufacturers are trying to determine the best relationship with the government. Mitsubishi Heavy Industries Ltd., which was named in 2007 by the government as the core company for the fast-breeder reactor project, reconstructed a development system by spinning off the departments in charge of the project into separate companies. The firm supports the national project and those smaller subsidiaries have continued to hire new employees, but the project is not expected to bring in any profits, as it is believed to take 50 years or longer for technology to become commercially viable.
Those who were involved in the research and development of the Monju reactor are now aged 55 or older, and make up less than 30 percent of the overall staff at Mitsubishi Heavy. As such a shortage of experienced engineers could hinder development of the project, some Mitsubishi Heavy workers are taking part in the ASTRID fast-breeder reactor project in France to gain know-how.
A Mitsubishi Heavy official says the company will secure personnel by making an effort to pass technology on to younger generations, hiring new engineers, and conducting in-house transfers, but if the momentum toward fast-breeder reactor development slows down, it could set the government's plans back.

Decommissioning Monju: Opposition from local authorities

Japan To Decommission Monju FBR, But Faces Opposition From Prefecture

http://www.nucnet.org/all-the-news/2016/12/20/japan-to-decommission-monju-fbr-but-faces-opposition-from-prefecture

Research & Development

Japan has decided to decommission the Monju prototype fast-breeder reactor, but is facing opposition from authorities in Fukui prefecture where the reactor is located. The Japan Atomic Industrial Forum said Fukui governor Issei Nishikawa said he would not accept the decision and would demand that the government reconsider it. According to Jaif, the government has said that a new experimental research

reactor would be built in the prefecture and that Monju will be used for research. Jaif said confirmation of the decision was expected at a Cabinet meeting today, 20 December 2016. Monju reached criticality for the first time in 1994, but it has mostly been offline since 1995. In November 2015 Japan's nuclear regulator, the NRA, said state-run Japan Atomic Energy Agency (JAEA) was not fit to operate Monju because it had repeatedly failed to correctly carry out inspections of the plant. According to Jaif, the NRA recommended at the time that the government find another operator to replace JAEA within six months. In December 1995, just months after Monju first started power transmission, it was shut down when 640 kg of liquid sodium leaked from a cooling system, causing a fire. There were no injuries and no radioactivity escaped plant buildings, but the incident was compounded by JAEA's attempts to cover up the scale of the damage. Monju was allowed to restart in May 2010 after JAEA carried out a review of the plant's design, and its safety procedures, which were shown to be inadequate. However, operation was again suspended in August 2010 after a fuel handling machine was dropped into the reactor during a refuelling outage. In May 2013 JAEA president Atsuyuki Suzuki resigned after the NRA prevented the restart of Monju due to inspection deficiencies. In November 2012 it was revealed that JAEA had failed to conduct regular inspections on almost 10,000 out of a total 39,000 pieces of equipment at Monju. Some of these included safety-critical equipment. Monju is a 246-MW sodium-cooled fast reactor at the Tsuruga nuclear power station in Fukui Prefecture, southwest Japan. It is designed to use mixed fuel rods of uranium and plutonium, and to produce more fuel than it consumes. Regarded as the core facility of the government's policy for nuclear fuel recycling, Monju is different from conventional nuclear power plants, which use water as coolants. Monju uses sodium as the coolant, meaning more sophisticated technology is required for its operation.

Related reports in the NucNet database (available to subscribers):

- Eight Years Needed To Restart Japan's Monju FBR, Says Minister (News in Brief No.237, 30 November 2016)

December 21, 2016

Scrapping Monju

Japan govt. decides to scrap Monju

https://www3.nhk.or.jp/nhkworld/en/news/20161221_24/

Japan's government has officially decided to scrap its prototype fast-breeder nuclear reactor Monju.

The decision was made at a meeting of relevant Cabinet ministers on Wednesday.

They said restarting the troubled reactor in Fukui Prefecture, central Japan, would require at least 8 years of preparation, and continued operation would cost more than 4.5 billion dollars.

They decided to dismantle the facility over some 30 years, citing growing costs.

The government is to oversee the decommissioning work.

It plans to create a system to enable Monju's builder, the Japan Atomic Energy Agency, to carry out the work while ensuring safety.

The government says it hopes to eventually make the area around the site one of the key research bases for developing fast reactors.

The ministers also confirmed that they will promote research and development at facilities in Japan and overseas, including a demonstration reactor to be designed with France and the experimental fast reactor Joyo in Japan.

Japan govt. to formally decide on Monju scrapping

https://www3.nhk.or.jp/nhkworld/en/news/20161221_18/

Japan's government will make a formal decision to scrap its prototype fast-breeder nuclear reactor Monju, at a meeting of relevant cabinet ministers on Wednesday.

Science Minister Hirokazu Matsuno said the government hopes to have a detailed plan by next April for decommissioning the troubled reactor in Fukui Prefecture. He said they will do their utmost to gain local support for the plan.

Matsuno and Industry Minister Hiroshige Seko presented the plan to Fukui Governor Issei Nishikawa on Wednesday, prior to the government's final decision.

Nishikawa had urged the government to review its decommissioning plan. He said discussions on the country's fuel recycling system and the body that will manage scrapping of the Monju were insufficient.

The government stressed at the meeting that the lessons learned from Monju would be applied to development of a fast reactor.

They said the current operator of the Monju will do the decommissioning under a new framework supervised by the government to ensure steady progress and safety.

They also said they will continue to consult with Fukui Prefectural officials on the process.

Governor Nishikawa refrained from endorsing the plan. He said the government was not convincing and that implementation will not go smoothly without local support.

Plug pulled on costly Monju fast-breeder reactor project

http://www.asahi.com/ajw/articles/AJ201612210059.html

By RYOKO TAKEISHI/ Staff Writer
The government on Dec. 21 formally turned out the lights on the Monju prototype fast-breeder reactor in Tsuruga, Fukui Prefecture, which cost more than 1 trillion yen ($8.5 billion) but operated for only 250 days.
A meeting of relevant Cabinet ministers connected with nuclear energy policy decided on Dec. 21 to mothball the embattled project.

But befitting its long history of problems, the end did not come quietly as Fukui Governor Issei Nishikawa blasted the central government for opting for decommissioning without giving adequate consideration to whether the work will actually be safe.
On the morning of Dec. 21, Nishikawa met with Hirokazu Matsuno, the science minister, and Hiroshige Seko, the economy minister.
Responding to the concerns previously raised by Nishikawa about the overall evaluation of the Monju project and the establishment of a safety control structure to oversee the decommissioning process, the central government officials promised to continue discussions with Fukui prefectural government officials.
Pledging to set up a comprehensive structure to lead the decommissioning, the government asked for the understanding of the Fukui prefectural government and said a more detailed plan for decommissioning Monju would be presented in April 2017.
But Nishikawa was not satisfied. In particular, he criticized the government approach of having the Japan Atomic Energy Agency assume the lead role in decommissioning Monju.
Saying he could not consent to that position, Nishikawa told reporters that he, as governor, had not given his approval for the decommissioning.
Nishikawa has pointed to concerns of his constituents because the Nuclear Regulation Authority has stated the JAEA has not adequately dealt with maintenance and management of the Monju reactor.
Nishikawa said he would continue to ask the central government for a more detailed explanation.
While agreeing to decommission Monju, the central government also decided to continue developing a fast reactor.
Science ministry officials said it would take a minimum of eight years to prepare a new reactor at the Monju site so it could resume operations as a fast reactor. It would also cost 540 billion yen to operate that reactor for an eight-year period.
The cost of decommissioning the fast-breeder reactor would be a minimum of 375 billion yen.
However, the central government has decided that proceeding with the development of a new fast reactor would create greater returns for the investment.
Decommissioning will start in the next fiscal year with preparations to remove the spent nuclear fuel, the removal of which will take until fiscal 2022. The entire decommissioning process is expected to be completed in 30 years.
When the Monju reactor was planned in the 1950s, it was considered a "dream" project that would produce more fuel than it consumed.
Monju was begun with the hope of producing a quasi-domestic energy industry for Japan, which has few natural energy resources.
Monju reached criticality in 1994, but the leaking of sodium coolant occurred the following year, causing a fire. The manner in which that accident was dealt with, as well as other problems in subsequent years, led to Monju barely being in an operable state.
In November 2015, the NRA recommended to the science minister that a new body be established to run Monju.
The science ministry took more than six months to establish a new body, but could not obtain the cooperation of electric power companies or equipment manufacturers.
In September 2016, the relevant ministers handling nuclear energy policy decided on a comprehensive review of the Monju project, including the possibility of decommissioning.

Japan decides to scrap trouble-plagued Monju prototype reactor

http://mainichi.jp/english/articles/20161221/p2g/00m/0dm/050000c

TOKYO (Kyodo) -- The Japanese government formally decided Wednesday to decommission the Monju prototype fast-breeder nuclear reactor in western Japan's Fukui Prefecture, which has barely operated over the past two decades despite its envisioned key role in the country's nuclear fuel recycling policy.

- 【Related】Gap emerges between gov't, private sector over fast reactor project

The decision in a ministerial meeting Wednesday, concluding a process that has included discussion of Japan's overall fast-reactor development policy by a government panel, comes despite failure to obtain local support for the plan.

The government has invested more than 1 trillion yen ($8.5 billion) in research and development for the reactor, having originally hoped it would serve as a linchpin of nuclear fuel recycling efforts as it was designed to produce more plutonium than it consumes while generating electricity.

With resource-poor Japan relying on uranium imports to power its conventional reactors, the government will continue to develop fast reactors in pursuit of a nuclear fuel cycle in which Japan seeks to reprocess spent fuel and reuse plutonium and uranium, extracted through reprocessing.

But Monju's fate is sure to prompt further public scrutiny of the fuel cycle policy, with many nuclear reactors left idled after the 2011 Fukushima nuclear power plant disaster. The public also remains wary of nuclear power generation after the disaster.

With the facility's decommissioning, and the accompanying loss of jobs and subsidies, the central government also risks damaging its rapport with Fukui, which hosts a number of other currently shuttered nuclear plants along the Sea of Japan coast.

The government has calculated it will cost at least 375 billion yen over 30 years to fully decommission Monju. It plans to remove the spent nuclear fuel from the reactor by 2022 and finish dismantling the facility in 2047.

Monju achieved sustained nuclear reactions, technically called criticality, in 1994. But it experienced a series of problems including a leakage of sodium coolant the following year and has been largely mothballed for the subsequent two decades.

Restarting operations at the plant would have cost at least 540 billion yen, according to government forecasts.

"We will decommission Monju given that it would take a considerable amount of time and expense to resume its operations," Chief Cabinet Secretary Yoshihide Suga told Wednesday's meeting.

"The nuclear fuel cycle is at the core of our energy policy," Economy, Trade and Industry Minister Hiroshige Seko told reporters after the meeting. His ministry will take over from the science ministry in overseeing the development of more practical fast reactors.

"We will make full use of the highly valuable knowledge and expertise acquired at Monju as we move forward with fast reactor development...first by concentrating on creating a strategic roadmap," Seko said.

Earlier Wednesday, the central government held a consultation meeting with Fukui Gov. Issei Nishikawa, who told reporters afterward that he remains opposed to the scrapping of the facility.

Nishikawa said in the meeting that decommissioning cannot begin without the approval of both the prefecture and the city of Tsuruga, where Monju is based.

"The governor told us today...that he wants a more thorough explanation of the specific mechanisms by which decommissioning will be carried out," Seko said after the decision was made.

"We will create opportunities for dialogue with the local area."

Nishikawa had said at a similar meeting Monday that the central government had not given enough justification for decommissioning Monju or considered the plant's operation history sufficiently.

He has also argued that the Japan Atomic Energy Agency, which operates Monju, is incapable of safely dismantling the reactor.

A nuclear regulatory body recommended last year that the JAEA be disqualified from operating the facility following revelations of mismanagement, including a massive number of equipment inspection failures in 2012.

Science minister Hirokazu Matsuno instructed JAEA President Toshio Kodama on Wednesday to come up with a decommissioning plan by around April next year. The government has said it plans to take third-party technical opinions into account in working out how the decommissioning will take place.
See also : http://www.japantimes.co.jp/news/2016/12/21/national/monju-prototype-reactor-key-cog-japans-nuclear-energy-policy-scrapped/

December 22, 2016

Govt to continue nuclear fuel cycle project despite everything

Gov't set to continue nuclear fuel cycle project despite Monju closure

http://mainichi.jp/english/articles/20161222/p2a/00m/0na/014000c

The government formally decided at a meeting of Cabinet ministers concerned with nuclear energy on Dec. 21 to decommission the trouble-plagued Monju prototype fast-breeder nuclear reactor in Tsuruga, Fukui Prefecture.

- 【Related】Japan decides to scrap trouble-plagued Monju prototype reactor
- 【Related】Plan to decommission troubled Monju reactor meets local criticism

Over 1 trillion yen in taxpayers' money has so far been invested in the reactor -- the core facility in the government's nuclear fuel cycle project in which spent nuclear fuel is reprocessed and reused in nuclear reactors.
Nevertheless, Monju, operated by the government-affiliated Japan Atomic Energy Agency (JAEA), will be shut down after being in operation for a total of only 250 days since the reactor reached criticality for the first time in 1994.
Still, the government, which is poised to continue the nuclear fuel cycle project, also agreed at the Dec. 21 meeting to draw up a road map by 2018 toward developing a fast reactor for the project.
In other words, the government is moving toward its "next dream" even without clarifying the cause of the failure of what they called "dream nuclear reactor" Monju and who is responsible for the fiasco.
"It's extremely important to maintain the nuclear fuel cycle project and promote the development of a fast reactor," Chief Cabinet Secretary Yoshihide Suga told a news conference following the decision.
However, continuation of the project will likely pose a challenge. The government's nuclear fuel cycle project involves two cycles -- one centered on a fast-breeder reactor and the other in which mixed-oxide (MOX) fuel, nuclear fuel made from reprocessed plutonium and uranium, is used in nuclear plants.
With the decision to decommission Monju, the cycle involving a fast-breeder reactor has failed. At the same time, the government has failed to smoothly press forward with the cycle involving the use of MOX fuel since most nuclear power plants have been idled since the outbreak of the Fukushima nuclear crisis in March 2011. The No. 3 reactor at Shikoku Electric Power Co.'s Ikata plant is the only nuclear reactor using MOX fuel, which is currently in operation.
A spent nuclear fuel reprocessing plant in Aomori Prefecture is undergoing safety screening by the Nuclear Regulation Authority (NRA), and pools holding spent nuclear fuel at atomic power stations across the country are filled to 70 percent of their capacities on average. Japan's stockpile of plutonium, which can be converted to use in nuclear weapons, has kept growing. By the end of 2015, the plutonium Japan possessed domestically and overseas had amounted to 47.9 metric tons.
The development of a fast reactor poses technological challenges. While a breeder reactor is designed to increase the amount of plutonium, the government emphasizes that a fast reactor that it is aiming to develop will play the role of an "incinerator" for nuclear waste such as by reducing the volume of high-level radioactive waste.

However, no experiment has been conducted on a fast reactor using actual radioactive waste. Hirofumi Nakamura, head of JAEA's planning and coordination division, acknowledged that the technology has not even reached the stage prior to putting it into practical use.
Serious questions persist about the feasibility of a fast reactor for economic reasons, and such a reactor is often dubbed as "modern alchemy."
The basic structure of a fast reactor and that of a breeder reactor are basically the same with the only differences being fuel types and arrangements. Therefore, a fast reactor, which is supposed to play the role of an incinerator for spent nuclear fuel, could be converted into a breeder reactor that produces plutonium.
A senior official of JAEA admits that "there is room for converting a fast reactor into one that breeds (plutonium)."
A fast reactor can be put into practical use after the development and production of experimental, prototype and then demonstration reactors. The government participates in the joint development of ASTRID, a French demonstration fast reactor. However, it remains unclear whether data and knowledge gained from the project in France, which is rarely hit by earthquakes, can be utilized in quake-prone Japan.
France is aiming to begin to operate the fast reactor in the 2030s, but the necessary funds for the project have only been allocated up to 2019. Questions remain as to whether Japan, which has aborted its project involving Monju, a prototype reactor, can be involved in a project to develop an upper-tier demonstration reactor.
Even those within the governing coalition are calling for caution in Japan's involvement in the joint development project in France. "Japan shouldn't ride on someone's (France's) back," said Hiroshi Hase, former education, culture, sports, science and technology minister.
NRA Chairman Shunichi Tanaka dismissed the feasibility of a demonstration reactor. "I understand that a demonstration reactor isn't realistic," Tanaka told a news conference on Dec. 21.

Time to scrap nuclear fuel cycle

Editorial: Time to scrap nuclear fuel cycle, not just Monju reactor

http://mainichi.jp/english/articles/20161222/p2a/00m/0na/009000c

The government formally decided on Dec. 21 to decommission Japan's Monju prototype fast-breeder nuclear reactor, yet will continue to pursue the nuclear fuel cycle in which plutonium is extracted from spent fuel through reprocessing to be used again. This stance by the government takes the existence of fast reactors and the nuclear fuel cycle as a foregone conclusion.
Over 1 trillion yen in public funds has been injected into the Monju project, yet due to recurring trouble and scandals, the reactor has operated for just 250 days over 22 years. The Nuclear Regulation Authority went as far as to point out that Monju's operator, the Japan Atomic Energy Agency, was not capable of running the reactor and should be replaced.
It is only natural for the reactor to be scrapped, but there remains a problem in that the government has closed its eyes to various issues in reaching its decision. Why was it unable to act sooner to put an end to the waste of taxpayers' money and decommission the reactor? Disregarding any probe into such issues, the government went ahead and made its decision behind closed doors. This in no way to win public approval.
An even more fundamental problem is that while the government is set to decommission the Monju reactor, it has decided to proceed with the development of a demonstration fast reactor -- a step up from Monju.

Fast reactors form a cornerstone of the nuclear fuel cycle. The decommissioning of Monju should mean the cycle is broken, and if that is the case, then what needs to be reviewed above all is the fuel cycle policy itself.
The government, however, is still trying to promote fast reactor development, on the grounds that maintenance of the nuclear fuel cycle was included in the nation's basic energy policy that the Cabinet approved in 2014.
As a step in that direction, the government has proposed taking part in France's project to build the Astrid fast demonstration reactor, but the feasibility of this project remains unclear, and the government's move sticks out as a seemingly stop-gap measure.
The reason the government has stuck to maintaining the nuclear fuel cycle is that as soon as it takes down its fuel cycle banner, spent fuel that was previously a "resource" becomes mere "waste." As a result, the Aomori Prefectural Government would probably have to ask power companies to take back the "resources" that have been piling up at the nuclear fuel reprocessing facility in the prefecture. And once the storage pools for spent fuel at the nation's nuclear power plants are full, those plants' reactors will have to be taken offline.
Politicians should be sitting down and working out measures to solve this problem; maintenance of the nuclear fuel cycle should not be used as an expedient.
Some may see officials as wanting to maintain the reprocessing of spent nuclear fuel from the viewpoint of potential nuclear deterrence, but this position lacks persuasiveness.
Five years and nine months have now passed since the onset of the disaster at the Fukushima No. 1 Nuclear Power Plant, and as we prepare to usher in a new year, there are still people living in temporary dwellings and other places to which they evacuated. And the government is trying to widely push the swelling costs of the disaster cleanup, reactor decommissioning, and compensation payments onto the public.
Looking squarely at this reality, fast reactor development is not something the government should be placing priority on tackling. It should give up on the nuclear fuel cycle and put the money to use in measures to assist Fukushima's recovery.

Review the failure of Monju

http://www.japantimes.co.jp/opinion/2016/12/22/editorials/review-failure-monju/#.WFvFMX2Dmid

Just as the government finally makes a belated decision to decommission the trouble-plagued Monju prototype fast-breeder reactor, it is seeking to pursue a successor project in order to keep alive its bid for a nuclear fuel cycle in Japan. What it should be doing first is conducting a thorough examination of why the Monju project ended in failure and holding an open discussion on whether the nuclear fuel cycle — in which Monju's technology was supposed to serve as a core component — is still a practical and feasible option for this country.
The formal decision to decommission the nation's sole prototype fast-breeder reactor in Tsuruga, Fukui Prefecture, was long overdue. Billed as a dream nuclear reactor for resource-scarce Japan because it produces more plutonium than it consumes as fuel, Monju first reached criticality in 1994, but it has been mostly offline after it was hit by a sodium coolant leak and fire in December 2015. Its trouble-prone operator was judged by the Nuclear Regulation Authority as unqualified to run the facility, but the government has been unable to build a new viable regime to restart its operation.
Despite the injection of more than ¥1 trillion in taxpayer money, Monju was in operation for a mere 250 days over the past 22 years, and never reached 100 percent of its output capacity. It is estimated that restarting the reactor under the updated safety regulations will take at least eight years — a process that, including acquisition of necessary data that will require an additional eight years, is

calculated to cost at least ¥540 billion. The decision to decommission the reactor — which in itself would require at least ¥375 billion over 30 years — was inevitable.
The problem is that the government seems to be moving headlong to the next project for its stalled nuclear fuel cycle policy without carrying out a proper assessment of Monju's failure — either from scientific viewpoints or policy perspectives. The government plans to compile by 2018 a road map for the domestic development of a demonstration fast reactor, which also consumes plutonium as fuel.
The government has long pursued a nuclear fuel cycle policy — in which spent fuel from nuclear power plants are reprocessed to extract plutonium for reuse as fuel — due to its efficient use of uranium resources. Monju was a facility in the second stage of development (from experimental to prototype, demonstration and commercial) of fast-breeder reactor technology — which was to be the core component of the policy. Still, the government says it will not review its nuclear fuel cycle policy. It intends to promote the use of plutonium-uranium mixed-oxide (MOX) fuel at conventional nuclear power plants — although MOX fuel is much more costly and its use remains low because the restart of nuclear plants idled since the 2011 meltdowns at Tokyo Electric Power's Fukushima No. 1 plant has been proceeding at a snail's pace.
What's puzzling is the plan to pursue the development of a demonstration fast reactor, even after the failure of the Monju project. The government reportedly says that even without restarting Monju, the same level of technological knowledge and data for development of a demonstration reactor can be obtained through a joint project with France to develop an advanced sodium technological reactor for industrial demonstration (ASTRID) and by using the Joyo experimental fast-breeder reactor. Still, ASTRID remains in its design stage, and it is unclear how much of its cost Japan will be sharing. The government has yet to publicly explain how much the development of a demonstration fast reactor will cost and how it plans to pay for it.
A bigger problem is that the plan to move forward on a fast reactor development was formulated in a closed discussion among a small group of people with stakes in nuclear power. The plan was adopted at the Council on Fast Reactor Development, which was set up by the Ministry of Economy, Trade and Industry and includes as members the economy and trade minister, the education and science minister, the head of the Japan Atomic Energy Agency — which operates Monju — the chairman of the Federation of Electric Power Companies of Japan, and the president of Mitsubishi Heavy Industries, a major nuclear power plant maker. It is unacceptable that the future direction of the nation's policy on nuclear energy and the decision to launch a costly new project are being made by a closed circle of interested parties without public discussions that reflect on Monju's failure.
The government has yet to give a convincing explanation of why the pursuit of a nuclear fuel cycle is still relevant as it seeks to reduce the nation's dependency on nuclear power and expand energy supply from renewable sources after the 2011 Fukushima crisis, which made it difficult to proceed with nuclear power generation in the same manner as before. The decision to end the Monju project should serve as a chance for the nation to rethink the policy itself and hold an open discussion on our energy needs and nuclear power.

EDITORIAL: Government still refuses to face up to reality, failure of Monju project

http://www.asahi.com/ajw/articles/AJ201612220041.html

The government officially decided on Dec. 21 to decommission the troubled Monju prototype fast-breeder reactor and instead develop a new fast reactor to maintain Japan's nuclear fuel recycling program.
The decision can be likened to a theater director determined not to declare an end to production despite dropping the spendthrift leading actor whose scandals have prevented him from performing on stage.

Fearing possible repercussions from the termination of the production, the director keeps promising to stage the play "sometime in the future." The director refuses to say clearly when the play will be staged because there is no actor in sight who can substitute for the dismissed one.
But this policy decision cannot be simply laughed away as an absurd piece of political theatrics. An enormous amount of taxpayer money has already been poured into Monju, and the government is poised to spend a huge additional amount to deal with its demise.
There is no doubt the Monju project has been a costly failure. The government cannot be allowed to put the debacle behind it by simply scrapping the experimental reactor and having the science and technology minister offer to return part of his salary for several months.
Despite an injection of more than 1 trillion yen ($8.5 billion) of public funds into the project, the reactor has been mostly out of operation for the 20-odd years since it first reached criticality in 1994.
Decommissioning the reactor will require an additional expenditure of nearly 400 billion yen, according to a government estimate.
An exhaustive postmortem for the project to identify the causes of its failure is in order.
The government should not waste any more money or make unreasonable efforts to keep its nuclear fuel recycling program alive.
The government has made the questionable claim that “a certain amount of useful knowledge” has been acquired through the Monju project that can be used to develop a new fast reactor. Instead, the government should confront the grim reality of this undertaking.
Four years ago, the science and technology ministry submitted a report on technological achievements in the Monju project to the Japan Atomic Energy Commission.
The report included estimated levels of achievements, weighted in terms of importance, in different areas.
The degree of achievement, expressed as a percentage, for equipment and system tests was, for instance, 16 percent. The figure for reactor core tests and irradiation issues was 31 percent, while that for operation and maintenance was nil. The overall achievement level was estimated at 16 percent.
Does the government believe this poor track record justifies its claim that “a certain amount of useful knowledge” has been obtained?
The clear moral of the Monju saga is that a huge price must be paid for failing to take a hard look at the reality and underestimating risks and problems.
Serious concerns about the cost-effectiveness of a nuclear fuel recycling program and the risk of nuclear proliferation from accumulating stockpiles of plutonium led many countries to give up developing fast-breeder reactors. Japan, however, bucked the trend and embarked on building Monju.
When sodium leaks occurred overseas, Japanese proponents insisted that such an accident would not happen at the Monju reactor.
When a sodium leak accident did occur at Monju in 1995, they made false announcements and covered up vital information.
Monju resumed operations in 2010 after a long hiatus, but mechanical trouble soon caused it to be shut down again.
Eventually, the ability and competence of the Monju operator, Japan Atomic Energy Agency, was called into question.
The government’s decision to decommission the reactor has long been delayed apparently because of fears that the step would raise questions about how to reprocess spent nuclear fuel in the recycling process and could have a negative impact on nuclear power generation itself.
The government should take this opportunity to confront the reality of its nuclear fuel recycling policy and try to create a new nuclear power policy that can win support of the public through open and broad debate.
Forging ahead with the plan to develop a fast reactor without following this process would be tantamount to betraying the people.

December 28, 2016

NRA approves Govt's decision to scrap Monju

Nuclear watchdog approves scrapping Monju reactor

https://www3.nhk.or.jp/nhkworld/en/news/20161228_19/

Japan's Nuclear Regulation Authority has approved the government's decision to scrap the Monju prototype fast-breeder nuclear reactor.

The education, science and technology ministry briefed the NRA on Wednesday about the government's decision last week about the troubled reactor in Fukui Prefecture on the Sea of Japan coast.

NRA Chairman Shunichi Tanaka said the decision is in line with the recommendation it made in November last year.

In it, the NRA urged an overhaul of a research and development project involving the reactor. It said scrapping the reactor would be an option unless a new operator were found for it.

The ministry also told the NRA on Wednesday that it will draw up a basic plan for decommissioning the reactor by next April.

It added that to eliminate possible safety risks soon, it will instruct reactor operator Japan Atomic Energy Agency to remove nuclear fuel from the reactor in about 5 and half years.

Tanaka asked the ministry to oversee the decommissioning process to ensure safety. He said the NRA will study whether relevant laws should be amended to step up regulation. He added that it may also set up an expert team to monitor the process.

April 23, 2017

800 billion yen to close Tokai reprocessing plant

Background:
Reprocessing is the dirtiest and most dangerous part of the nuclear fuel chain.
Irradiated nuclear fuel contains literally hundreds of human-made radioactive byproducts which are collectively millions of time more radioactive than unused nuclear fuel. Inside the core of a nuclear reactor, the radioactivity of the irradiated fuel is so intense that it can melt the core of the reactor at a temperature of 2800 degrees C (5000 degrees F) even if the reactor is totally shut down.
In a reprocessing plant the intensely radioactive solid fuel elements are chopped up and dumped into a metallic basket suspended in boiling nitric acid, so that plutonium can be chemically extracted from the radioactive liquid solution. Radioactive gases and vapours are released, plutonium-bearing liquid effluents occur, radioactive equipment and piping and left behind, and millions of gallons of high-level radioactive liquid waste are produced.[...]
Gordon Edwards.

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Japan Atomic Energy Agency:

Closure of Tokai Reprocessing Plant to cost an estimated 800 billion yen ($10 billion Canadian)

http://www.japantimes.co.jp/news/2017/04/23/national/closure-tokai-reprocessing-plant-cost-estimated-%C2%A5800-billion-jaea-source/

The Japan Atomic Energy Agency has revealed that the scrapping of the Tokai Reprocessing Plant, the nation's first facility for reusing spent nuclear fuel, will cost an estimated ¥800 billion, an official said.
The state-backed JAEA did not reveal the cost to taxpayers in 2014, when it made the decision to shut down the plant in the village of Tokai, Ibaraki Prefecture, over a 70-year period.
The facility started operation in 1977 as part of Japan's desire to establish a nuclear fuel cycle, in which all spent fuel is reprocessed to extract its plutonium and uranium to make more fuel. The policy is designed to ensure resource-dependent Japan uses its nuclear fuel as efficiently as possible.
The JAEA decided to scrap the sprawling plant after it became too costly to run under the more stringent safety rules introduced following the 2011 Fukushima nuclear crisis. The facility comprises around 30 buildings and has large areas rife with contamination caused by its task of disassembling spent nuclear fuel.
According to the official, the startling decommissioning estimate is based on an estimate the agency made in 2003. The JAEA is finalizing the assessment and on course to submit it for approval by the Nuclear Regulation Authority as early as June.
The three-tier disposal scheme for the waste generated by the Tokai Reprocessing Plant is based on radiation level.
Waste with the highest radiation level, which will fill some 30,000 drums, will be buried more than 300 meters underground.
Mid-level waste, which will fill about 24,000 containers, is expected to be buried several dozens of meters underground.
Low-level waste, involving another 81,000 drums, will be buried close to the surface, the JAEA said.
In the meantime, the plant's tainted equipment and facilities will need to be decontaminated and scrapped before being filled with cement and mortar and put in drums for transport to a final disposal site.
The big problem is, there has been little progress in deciding where to bury the drums because they can't find anyone willing to accept them.
Despite the Fukushima nuclear disaster, the government is trying to resume nuclear power generation and continue its pursuit of a nuclear fuel cycle.
This policy, however, has experienced setbacks from the recent decision to decommission the Monju fast-breeder reactor, an experimental facility in Fukui Prefecture that was considered key to the nuclear fuel cycle plan.
And the completion of a new fuel reprocessing plant in the village of Rokkasho, Aomori Prefecture, has also been largely behind schedule for years.
In the meantime, public concerns about the safety of atomic power remain strong at a time when the government is aiming to make it account for 20 to 22 percent of Japan's electricity supply by 2030.
[Note: In 2011, before the Fukushima-Daiichi disaster, nuclear provided 30% of Japan's electricity. GE]
The new estimate for decommissioning the Tokai Reprocessing Plant includes ¥330 billion for storing waste underground, ¥166 billion for decontaminating and dismantling the facility, and ¥87 billion for transportation costs.
The JAEA facility is not to be confused with the private uranium-processing facility in Tokai where a fatal criticality accident occurred in 1999.

[See http://tinyurl.com/me8qdvd *for a description of the accident and its aftermath. GE]*

610 tons of spent fuel and nowhere to go

Background:
After the end of WWII, Japan was persuaded by the Allies to embrace nuclear power -- partly as a way of expiating the horror of the Atomic Bomb explosions at Hiroshima and Nagasaki, but mainly as a way of achieving energy independence. To avoid the necessity of purchasing fuels off-island, the Japanese were urged to embrace the nuclear reprocessing option. By routinely extracting plutonium and unfissioned uranium from irradiated nuclear fuel, they were informed, new fuel could be fabricated by blending the recovered plutonium with the unfissioned uranium. This new plutonium-based fuel is called MOX – an acronym for Mixed Oxide fuel. As a result, Japan developed no plans for the long-term storage of irradiated nuclear fuel. Spent fuel was to be regarded as an energy resource rather than as nuclear waste. And as it happens, spent MOX fuel contains even larger amounts of highly toxic radioactive substances than spent uranium fuel from conventional reactors.
The **Fugen advanced converter reactor** started up in 1978. It was the first reactor in the world to use a full MOX fuel core. It had 772 MOX fuel assemblies, the most for any reactor anywhere. It has received the title of a historic landmark from the American Nuclear Society. The Fugen reactor boiled ordinary water as in standard boiling water reactor (BWR) but used heavy water as a moderator as in a CANDU reactor. The Fugen reactor was shut down permanently in 2005.
The **Monju prototype fast breeder reactor** (1994-2016) was designed to produce more plutonium as a byproduct than the plutonium it uses as a fuel. That's why it's called a "breeder". But for this breeding process to work, the fuel has to be much more "enriched" in fissile material. It has to be nuclear-weapons-usable material,, capable of sustaining a nuclear chain reaction using "fast neutrons", without the use of any moderator. That's why it's called a "fast" breeder. So, instead of using water as a.coolant (which inevitably slows down the fast neutrons) the Monju reactor uses liquid sodium (a liquid metal) as a coolant. Needless to say, the liquid sodium becomes highly radioactive, just as the primary coolant of any recator is highly radioactive.
The Monju reactor has been inoperative for most of the time since it was first built. It last operated in 2010, and last year it was decided top decommission it. The Japanese have no idea at present how to dispose of the spent fuel or the radioactiuve sodium from Monju. Radioactive sodium is yet another nuclear conundrum.
At **Fukushima-Daiichi nuclear power plant**, Unit 3 (one of the reactors that suffered a complete core meltdown) was fuelled with a heterogenous core of uranium oxide fuel and plutonium-based mixed oxide fuel (about 6 percent of the fuel was MOX). Unit 3 was the only one of the six reactiors at Fukushima-Daiichi that had MOX fuel in its core.
Gordon Edwards.

April 30, 2017

Lack of transfer sites for 610 tons of spent fuel might delay closure plans for seven reactors

http://www.japantimes.co.jp/news/2017/04/30/national/transfer-sites-610-tons-spent-nuclear-fuel-undecided-decommissioning-plans-may-affected/#.WQeClNykKie

About 610 tons of spent nuclear fuel stored at seven of the 17 reactors in Japan that are set to be decommissioned have no fixed transfer destination, it was learned Sunday, threatening to hold up the decommissioning process.

If it remains undecided where to transfer the spent nuclear fuel, work to dismantle reactor buildings and other structures may not be carried out as planned.
The tally excludes the six reactors at Tokyo Electric Power Co. Holdings Inc.'s Fukushima No. 1 plant, which was heavily damaged by the March 2011 earthquake and tsunami.
The seven reactors are
1) the Japan Atomic Energy Agency's Fugen advanced converter reactor,
2) the agency's Monju prototype fast-breeder reactor,
3) Japan Atomic Power Co.'s reactor 1 at its Tsuruga plant,
4-5) reactors 1 and 2 of Kansai Electric Power Co.'s Mihama plant,
6) reactor 1 of Chugoku Electric Power Co.'s Shimane plant and
7) reactor 1 of Kyushu Electric Power Co.'s Genkai plant,
according to the companies and the agency.
The Fugen reactor has 70 tons of spent mixed-oxide, or MOX, fuel, a blend of uranium and plutonium recycled from spent nuclear fuel.
The agency has abandoned its plans to move the MOX fuel out of the reactor site in the current fiscal year to March 2018. It has considered consigning the reprocessing of the fuel overseas but a contract has not been signed yet.
The agency's schedule to finish the decommissioning work by fiscal 2033 has remained unchanged, but an official admitted that the timetable will be affected if a decision on where to transfer the spent fuel is not made.
As for the trouble-prone Monju reactor, the agency has yet to submit a decommissioning program to authorities. How to deal with 22 tons of spent MOX fuel at the reactor is a major issue.
The Mihama No. 1 reactor has 75.7 tons of spent conventional nuclear fuel and 1.3 tons of spent MOX fuel, while the No. 2 reactor has 202 tons of spent nuclear fuel. Kansai Electric plans to take them out of Fukui Prefecture, which hosts the power plant, by fiscal 2035, but the transfer location has not yet been selected.
At the Tsuruga plant's reactor 1, Japan Atomic Power plans to transfer 31.1 tons of the reactor's 50-ton spent nuclear fuel to the fuel pool of reactor 2, with the rest to be transported by fiscal 2026 to a Japan Nuclear Fuel reprocessing plant under construction in the village of Rokkasho in Aomori Prefecture.
After being postponed more than 20 times, the completion of the reprocessing plant is currently slated for the first half of fiscal 2018 and the blueprint is undergoing screenings by the Nuclear Regulation Authority, a nuclear watchdog.
As nuclear fuel cannot be brought into the reprocessing plant until it starts operations after receiving all necessary regulatory approval, it is uncertain whether the Tsuruga reactor fuel can be transferred as planned.
Chugoku Electric aims to transfer 122.7 tons of spent nuclear fuel at its Shimane plant's reactor 1 to the Rokkasho reprocessing plant by fiscal 2029.
Kyushu Electric hopes to take 97.2 tons of spent nuclear fuel at the Genkai reactor 1 out of its fuel pool by fiscal 2029, but the destination has not been fixed.
At three other nuclear plants with reactors set to be decommissioned, spent nuclear fuel is mostly planned to be moved out of the current pools to other pools within the same plant.
In the case of Tepco's disaster-stricken Fukushima No. 1 plant, the site of the 2011 triple meltdown accident, where the 2,130 tons of spent nuclear fuel will be transferred to has yet to be decided.
Still, the decommissioning work for the six reactors there will not be affected in any significant way for the time being, as more urgent tasks, such as a survey of melted fuel, have been given higher priority, officials said.

July 4, 2017

Expensive reprocessing

Cost of building nuclear fuel reprocessing plant up 4-fold

http://www.asahi.com/ajw/articles/AJ201707040050.html

Construction costs for the long-delayed spent nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture, are likely to rise to 2.9 trillion yen ($25.67 billion), about four times the initial estimate, Japan Nuclear Fuel Ltd. (JNFL) has disclosed.
The company attributes the latest cost estimate increase of 750 billion yen, revealed July 3, to the necessity of meeting more stringent safety standards introduced after the 2011 nuclear crisis in Fukushima Prefecture.
Estimated construction costs previously stood at 2.193 trillion yen as of 2005.
The total cost of the project, including operating the plant for 40 years and then decommissioning it, was initially estimated at 12.6 trillion yen.
However, it is expected to rise to 13.9 trillion due to the increase in maintenance and personnel costs.
The major electric power companies that jointly set up JNFL have to cover those costs, but ultimately consumers will shoulder the burden in the form of electricity rates.
JNFL is constructing the plant in the village of Rokkasho, with the Nuclear Reprocessing Organization of Japan (NURO) contracted to handle the fuel reprocessing.
JNFL and NURO say the additional 750 billion yen to cover the new safety measures includes budgeting for a building to serve as a command center in the event of a severe accident, and installation of tanks to store cooling water.
The plant was initially scheduled to be completed in 1997 with construction costs of 760 billion yen, but equipment-related troubles struck the project in succession, and the completion date has been postponed 22 times to date.
The Nuclear Regulation Authority (NRA), the country's nuclear watchdog, is now conducting final-stage screening of the reprocessing plant ahead of the start of full-scale operations.
JNFL said previously that it is aiming to complete the plant by the end of September 2018 on the assumption that the NRA's screening finishes by the end of March 2017.
However, a false report was found in relation to a safety rule violation that came to light in 2015, leading to the delay of the NRA's screening.
Even if the NRA approves the new safety measures in the screening, the approval is expected to be made this autumn at the earliest, meaning the latest completion target of September 2018 is likely to be missed.

July 5, 2017

MOX shipment leaves France

MOX fuel to be shipped from France to Japan

https://www3.nhk.or.jp/nhkworld/en/news/20170705_34/

Preparations for shipping MOX, or mixed oxide, fuel to be used in a recently restarted nuclear reactor in Fukui Prefecture, central Japan, is underway in northwestern France.

Two vessels designed for shipping nuclear materials are expected to leave the port of Cherbourg on Wednesday.

French nuclear energy firm Areva manufactured the recycled fuel, which is a mixture of plutonium extracted from spent nuclear fuel and uranium.

The MOX fuel is to be used in the No.4 reactor at the Takahama nuclear plant, which Kansai Electric Power Company restarted in May.

Two specially designed casks containing MOX fuel assemblies were mounted on the vessels by a crane after they were transported to the port on a trailer.

Security was tight as anti-nuclear activists rallied near the port.

According to Areva, this is the sixth time the company is shipping MOX fuel to Japan and the second time since the 2011 nuclear accident in Fukushima Daiichi nuclear plant.

The company says the shipment will take about two to three months, but that the route will be announced in two weeks as a precaution.

Areva is facing worsening business conditions as more countries aim to phase out nuclear power plants. The company's spokesman said it hopes to continuously provide MOX fuel to Japan.

July 6, 2017

MOX fuel shipment leaves France for Japan

https://www3.nhk.or.jp/nhkworld/en/news/20170706_17/

A shipment of reprocessed nuclear fuel destined for a Japanese power plant has left France.

Two specially fitted vessels left the port of Cherbourg, northwestern France, on Wednesday.

French nuclear energy firm Areva manufactured the MOX, or mixed oxide, fuel, a mixture of uranium and plutonium reprocessed from spent nuclear fuel.

The fuel is to be used in the No. 4 reactor at the Takahama nuclear plant, which Kansai Electric Power Company restarted in May.

Areva says it is the sixth time the company has shipped MOX fuel to Japan, and the second since the 2011 nuclear accident at the Fukushima Daiichi nuclear plant.

The company says the route of the shipment, which will take about 2 to 3 months to arrive in Japan, will be withheld for two weeks for security reasons.

Areva's nuclear business is struggling. Tough post-Fukushima safety requirements have hit construction of nuclear power plants worldwide.

A company official said they hope to continue supplying MOX fuel to Japan.

September 14, 2017

Start of Rokkasho plant postponed again

Work to be delayed for nuclear recycling plant

https://www3.nhk.or.jp/nhkworld/en/news/20170914_14/

The planned completion of a nuclear fuel reprocessing plant in Aomori Prefecture is expected to be difficult by the first half of fiscal 2018, because of problems involving inflow of rainwater.

The Nuclear Regulation Authority indicated on Wednesday that the plant in Rokkasho Village, northeastern Japan, which is supposed to reprocess spent nuclear fuel, will not pass screening until its safety is ensured for the entire facility. Passing the screening is a precondition for full-scale operation of the plant, which is a pillar of the government's nuclear fuel recycling program.

The decision will force the operator Japan Nuclear Fuel Limited to delay its plan to complete the plant as planned.

Last month, workers at the plant found that rainwater has been flowing through underground pipes into a building where an emergency power generator is installed. It was also revealed that the underground tunnel for the piping has not been inspected for 14 years.

The operator says it will present an inspection plan by the end of the current fiscal year in March 2018.

But observers say the screening process will likely be significantly extended. They say it will also take a long time to gain approval for detailed plant designs and to pass inspection, making it difficult to complete the plant as scheduled.

September 30, 2017

Rokkasho reprocessing plant: Delayed again

Completion of Rokkasho nuclear reprocessing plant likely to be delayed yet again

https://www.japantimes.co.jp/news/2017/09/30/national/completion-rokkasho-nuclear-reprocessing-plant-likely-delayed-yet/#.WdD42sZpGpq

JIJI
Japan Nuclear Fuel Ltd. is unlikely to complete a spent nuclear fuel reprocessing plant by the end of September 2018 as planned, its executive president and chief executive officer, Kenji Kudo, said Friday.
It will be “difficult” to achieve the target, Kudo told a news conference.
The company expects to delay submitting documents necessary for the plant in Rokkasho in Aomori Prefecture to pass safety screening, he said.
Japan Nuclear Fuel for now needs to focus on addressing incidents such as an inflow of rainwater into a plant building, Kudo said.

The company has postponed the completion date 22 times. It set the current target in November 2015.

October 11, 2017

Rokkasho: 14 years of faked safety checks

Unfinished nuclear fuel reprocessing plant faked safety records: NRA

http://mainichi.jp/english/articles/20171011/p2a/00m/0na/017000c

The firm that owns an uncompleted nuclear fuel reprocessing plant in Aomori Prefecture failed to conduct necessary checks and falsified safety check records relating to the plant, the Nuclear Regulation Authority (NRA) has reported. The NRA concluded on Oct. 11 that Japan Nuclear Fuel Ltd. (JNFL) has violated safety measures after it was learned that the firm failed to carry out the required checks and nevertheless continued to write down "no abnormalities" in safety check records. There has been a spate of incidents such as the flow of rainwater into facility buildings at the plant in the Aomori Prefecture village of Rokkasho.
The plant, which is scheduled to reprocess spent nuclear fuel, was on the verge of hosting a final-stage NRA safety inspection, but the checkup is likely to be postponed considerably as JNFL now has to prioritize in-house inspections of all facilities at the plant.
One of the main roles of a nuclear fuel reprocessing plant is the extraction of reusable uranium and plutonium from spent nuclear fuel, making it a key part of the nuclear fuel cycle. However, the Rokkasho plant has been riddled with problems, and its completion date has been postponed 23 times since the initial planned opening date of 1997. Currently, the plant is scheduled to be completed in the first half of fiscal 2018, but this could be difficult.
In August, it came to light that about 800 liters of rainwater had flowed into an emergency electrical power building at the plant. The cause was the leaking of rainwater from an underground facility. This facility, however, has never been checked since its construction in 2003. JNFL nevertheless gave it a false "no abnormalities" appraisal in its daily records. Furthermore, about 110 liters of rainwater also flowed into the underground facility in September.
Apparently, the firm has tried to clarify the issue by saying that, "The (no abnormalities) comment was referring to another underground facility nearby."
The company plans to complete safety checks at all its Rokkasho plant facilities within the year, and then submit the results to the NRA -- with the intention of inviting the NRA to resume safety inspections of the plant.

October 12, 2017

Japan Nuclear Fuel skipped safety checks at Rokkasho plant for 14 years

https://www.japantimes.co.jp/news/2017/10/12/national/japan-nuclear-fuel-skipped-safety-checks-rokkasho-plant-14-years/#.Wd9XkDtpGos

Kyodo

Nuclear regulators concluded Wednesday that Japan Nuclear Fuel Ltd. violated legally binding safety rules by failing to conduct necessary checks for over a decade at its uncompleted spent nuclear fuel reprocessing plant in the country's northeast.
The failure of checks at an underground portion of the plant in the village of Rokkasho in Aomori Prefecture for about 14 years eventually resulted in about 800 liters of rainwater flowing into a building housing an emergency diesel generator in August this year. The generator is a crucial device in times of crisis such as the loss of external power.
Japan Nuclear Fuel President Kenji Kudo said at a Nuclear Regulation Authority's meeting that he will prioritize inspections of all facilities at the plant and suspend its operations to seek a safety approval on the plant to put it on stream.
The utility plans to check its facilities and some 600,000 devices by the end of this year before requesting the authority to resume its safety assessment for the plant.
The body applied for a safety assessment of the plant in 2014 and aimed to complete it in the first half of fiscal 2018, but the goal is likely to be delayed due to the need for inspections.
The envisioned nuclear fuel reprocessing plant is a key component of the government's nuclear fuel recycle policy, which aims to reprocess spent uranium and reuse extracted plutonium and uranium as reactor fuel.
But the Rokkasho plant has been inundated with problems, with its completion date postponed 23 times since 1997, its initial target. It also had to meet new, tougher safety standards made in the wake of the crisis at the Fukushima No. 1 nuclear power complex, triggered by the powerful March 2011 earthquake and tsunami that devastated parts of the Tohoku region.
The authority also said holes and cracks at exhaust pipes found at Japan Nuclear Fuel's uranium enrichment plant in September also violated safety rules. The defects had been undetected due to a lack of inspections.
A utility compiles safety programs, which need to be assessed and approved by the authority.
If any grave flaws are found, the authority can issue an order to stop the operation of the plants or retract its approval to construct a nuclear plant.
Japan Nuclear Fuel "should have a substantial sense of crisis," a member of the authority said. "We will take necessary measures if an improvement is not seen in ensuring the safety (in operating the plant)."

November 8, 2017

Aomori: Cesium traces from previous leak?

Cesium traces found at Aomori nuke site believed from 2010 container leak

https://www.japantimes.co.jp/news/2017/11/08/national/cesium-traces-found-aomori-nuke-site-believed-2010-container-leak/#.WgLyOXaDOot

Kyodo

AOMORI – Small amounts of radioactive cesium were detected on a glove of a worker at a nuclear facility in Aomori Prefecture last month, Japan Nuclear Fuel Ltd. said Thursday.
However, as the worker was not himself exposed to any radiation and none was recorded outside the building, it is believed the cesium was the result of a previous leak.
The company suspects the cesium leaked from a container of high-level radioactive liquid waste in July 2010 at the spent nuclear fuel reprocessing plant, which has yet to start operations. In the previous incident, a facility worker was exposed to radiation.

According to a report submitted to the Nuclear Regulation Authority, a trace of cesium was detected on Oct. 27 on the glove of the worker, who was working on the second floor of the building.
Japan Nuclear Fuel said it found radioactive contamination at three spots on the same floor, adding the spots had since been cleaned up.
The authority instructed the company to conduct a probe into the latest incident, saying it is obvious that it failed to conduct sufficient decontamination work when the 2010 incident occurred.
Japan Nuclear Fuel said it is highly possible that remnants of radioactive materials from the previous incident were floating in the air and became attached to the glove.
Nuclear power facility operators in the country have come under criticism in recent years for lacking safety awareness and improper management of radioactive materials.
In June, five workers suffered internal radiation exposure after a plastic bag exploded and scattered radioactive materials during an inspection of a container of fuel materials at Japan Atomic Energy Agency's research facility in Ibaraki Prefecture.

November 29, 2017

Decommissioning Monju, yes, but how?

Monju reactor set for decommissioning lacks sodium removal method

https://mainichi.jp/english/articles/20171129/p2a/00m/0na/013000c

The Japan Atomic Energy Agency (JAEA) has revealed that the Monju prototype fast-breeder nuclear reactor in Tsuruga, Fukui Prefecture, which is set to be decommissioned, was designed without any consideration of ever having to remove liquid sodium from inside the reactor vessel.

- 【Related】Gov't set to continue nuclear fuel cycle project despite Monju closure

While removal of the radioactive liquid sodium is a key task in terms of early phase decommissioning of the nuclear reactor, the JAEA is likely to be unable to specify a method for extracting the sodium in its decommissioning plan that is due to be submitted to the Nuclear Regulation Authority (NRA).
Water is normally used as a nuclear fuel coolant in power plants but in the case of the Monju reactor, liquid sodium is used instead to increase production of plutonium. However, liquid sodium ignites when it comes into contact with air, and it causes an explosive chemical reaction when it is mixed with water. In 1995, some liquid sodium leaked from the Monju reactor, causing the reactor to be shut down for a long period of time.
According to the JAEA, the primary coolant system facility for nuclear fuel at Monju is covered with an alloy wall, and workers cannot get close to the reactor vessel. Furthermore, the reactor vessel is designed in such a way that the amount of liquid sodium does not go below a certain level so that nuclear fuel is not exposed. As a result, of about 760 metric tons of liquid sodium used for the primary coolant system, several hundred inside the reactor vessel cannot be extracted.
Since operations at the Monju reactor were commenced in 1994, liquid sodium inside the reactor vessel has never been removed.
In an interview with the Mainichi Shimbun, a senior official at the JAEA acknowledged that the reactor had been designed without any regard for removing liquid sodium from the reactor vessel, saying, "When the reactor was being designed, the main priority was to finish the project quickly. Decommissioning was not taken into account." In addition, the liquid sodium has been exposed to radiation, making it difficult for humans to approach it and perform tasks.
The JAEA intends to consider ways of extracting the sodium by a specialist decommissioning division to be set up as early as fiscal 2018. However, the NRA expresses concern, stating that, "There are no

holes through which to extract sodium from the reactor, and there are no completely safe methods for removing the sodium."
Keiji Kobayashi, a former instructor at Kyoto University Research Reactor Institute who is an expert on the Monju reactor, states, "**It has to be said that there are defects in the design. It is also thought that the number of staff members who understand the structure of the reactor is declining. If the sodium is removed erratically, it could lead to a major accident**."

December 4, 2017

Monju decommission pact

Monju decommission pact to be signed on Tues.

https://www3.nhk.or.jp/nhkworld/en/news/20171205_02/

Authorities in Fukui Prefecture, central Japan, are set to sign a pact with the operator of the prototype fast-breeder nuclear reactor, Monju, regarding its dismantling.

Following a series of safety management problems, the Japanese government decided last year to scrap the troubled reactor. The process will take about 30 years.

Sources familiar with the matter told NHK that the prefecture, and the host city of Tsuruga, plan to sign the deal with Monju's operator, the Japan Atomic Energy Agency, on Tuesday.

The aim of the pact is to ensure the safe decommissioning of the facility.

Liquid sodium -- a chemical that explodes when exposed to water or air -- is used as a coolant at Monju. For that reason, it is more difficult to scrap the reactor than it is to dismantle other types.

The deal is expected to include briefings to local authorities at turning points in the process of dismantling the facility, as well as measures to reduce as much radioactive waste as possible during the decommissioning process.

After the pact has been signed, the operator will submit a detailed plan to the country's nuclear regulator.

No restart yet for Joyo (experimental) reactor

Experimental nuclear reactor Joyo restart delayed

https://www3.nhk.or.jp/nhkworld/en/news/20171204_27/

The operator of a suspended experimental fast reactor in Ibaraki, north of Tokyo, has decided to delay its restart currently set by March 2022.

The Joyo experimental fast nuclear reactor is expected to replace the prototype fast-breeder nuclear reactor, Monju, as part of the development of fast reactors in Japan.

The Japanese government decided to scrap the trouble-marred Monju last year.

The Japan Atomic Energy Agency in March submitted a request for the state to carry out a safety assessment of Joyo with the aim of restarting the reactor by March 2022.

The document stated that Joyo will run on 100,000 kilowatts despite its total output capacity of 140,000 kilowatts to accommodate a smaller-scale evacuation plan for nearby residents in case of an accident.

The Nuclear Regulation Authority delayed the inspection, and instead asked the operator to run on its total capacity.

The agency is considering reducing the amount of nuclear fuel inside the reactor to reduce output.

Officials say they will apply for government inspections next year.

They say the agency must still decide when it will put Joyo back online.

December 6, 2017

Monju decommissioning plan

Atomic energy agency submits Monju reactor decommissioning plan

https://mainichi.jp/english/articles/20171206/p2a/00m/0na/023000c

The Japan Atomic Energy Agency (JAEA) submitted a plan to the Nuclear Regulation Authority (NRA) on Dec. 6 stating that it aims to complete decommissioning of the Monju prototype fast-breeder nuclear reactor in Tsuruga, Fukui Prefecture, by fiscal 2047.

- 【Related】Monju reactor set for decommissioning lacks sodium removal method

If the NRA approves the plan, the JAEA will be able to go ahead with decommissioning work at the reactor. However, a range of issues such as where to place the spent nuclear fuel scheduled to be extracted from the site as well as how to remove liquid sodium still remain.
According to the plan, the decommissioning process will be split into four stages. The first stage is set to take place between fiscal 2018 and fiscal 2022 and will consist of removal of all 370 nuclear fuel assemblies from the reactor.
In the second and subsequent stages, which are scheduled to occur between fiscal 2023 and 2047, approximately 1,670 metric tons of liquid sodium coolant are planned to be extracted. Moreover, the building housing the reactor is set to be dismantled during this period.
The JAEA has not yet drawn up a specific schedule. However, it is planning to submit a more detailed plan to the NRA, with the view of undergoing some form of screening process.
The Monju reactor is unique because there are no previous examples of fast-breeder reactors being decommissioned in Japan. It differs to conventional nuclear power plants, as the method for extracting nuclear fuel from the site is complicated. Therefore, the NRA has decided to opt for the rare move of conducting screening from the relatively early stage of nuclear fuel removal.
With regard to the total amount of radioactive waste, it is estimated that approximately 26,700 tons will need to be removed from the reactor before the end of decommissioning.

In the morning on Dec. 6, JAEA executive director Hajime Ito visited the NRA to submit the decommissioning plan. "Taking various regrets into account, I want to win back the trust of the people by carrying out safe and reliable decommissioning," Ito said.
The decision to decommission the Monju reactor was made by the government in December 2016. However, the submission of the decommissioning plan was delayed as local representatives demanding regeneration of the area and enhanced safety measures failed to reach an agreement with the government.

Nuclear reactor operator submits 30-year plan to scrap trouble-prone Monju facility

https://www.japantimes.co.jp/news/2017/12/06/national/nuclear-reactor-operator-submits-30-year-plan-scrap-trouble-prone-monju-facility/#.WifgZHmDOos

Kyodo
The operator of the Monju prototype fast-breeder nuclear reactor submitted a plan Wednesday to decommission the trouble-plagued facility located in Fukui Prefecture.
The most recent plan presented to the Nuclear Regulation Authority lays out a 30-year time frame to complete the project despite a number of problems that remain unresolved, including where to store the spent nuclear fuel.
The government had originally hoped the Monju reactor would serve as a linchpin for its nuclear-fuel-recycling efforts as it was designed to produce more plutonium than it consumed.
But it experienced a series of problems, including a leakage of sodium coolant in 1995 and equipment failures in 2012. The plant has only operated intermittently over the past two decades.
Under the latest proposal, the facility's operator, the Japan Atomic Energy Agency, plans to divide the 30-year disassembly period through 2047 into four phases. In the first phase, nuclear fuel will be extracted from the reactor core and other places by March 2022, followed by the second phase whereby pipes and pumps where sodium coolant was circulated will be disassembled. The agency will begin the primary scrapping of the reactor in the third phase.
In what is to be the first decommissioning of a fast-breeder reactor in the nation, some 26,700 tons of solid radioactive waste is expected to be produced. The local government is calling on the operator to swiftly remove the nuclear fuel and sodium from the prefecture.
After the central government decided to scrap the reactor in December last year, the Fukui Prefectural Government expressed concern over JAEA's leading role as it had been judged unqualified to operate the reactor safely by the Nuclear Regulation Authority.
In response, the government beefed up oversight over the effort and the agency accepted external experts from electric utilities and manufacturers to play central roles in the decommissioning work.
Prior to the plan's submis
sion, the agency on Tuesday concluded an agreement on safety measures and regional development plans with the Fukui Prefectural Government and the city of Tsuruga, which hosts the reactor.

Monju operator presents decommissioning plan

https://www3.nhk.or.jp/nhkworld/en/news/20171206_16/

The Japan Atomic Energy Agency has presented a detailed plan for decommissioning its prototype fast-breeder nuclear reactor over 30 years.

The government decided last year to scrap the Monju reactor in Fukui Prefecture, central Japan, after a series of accidents and other safety problems.

The agency submitted its plan to the Nuclear Regulation Authority on Wednesday. It calls for dismantling the reactor in 4 phases, ending in fiscal 2047.

The first phase starts next year with the removal of 530 units of nuclear fuel over 5 years. Liquid sodium coolant that is free of radioactive substances will also be removed by April 2019.

Dismantling of the reactor and the building will follow.

The work begins once the Nuclear Regulation Authority approves the plan.

Japan Atomic Energy Agency board member, Hajime Ito, said they will focus first on fuel removal while continuing safety checks and educating and training staff.

The agency agreed with the Fukui prefectural government on Tuesday to report on the progress of the dismantling to the public.

The agency also plans to transport nuclear fuel and sodium outside the prefecture, but no decision has been made about where to take it.

December 13, 2017

Decommissioning Monju, but how?

Editorial: Monju reactor will be decommissioned, but mountain of uncertainty remains

https://mainichi.jp/english/articles/20171213/p2a/00m/0na/026000c

The Japan Atomic Energy Agency (JAEA) has submitted its plan to decommission the Monju experimental fast-breeder reactor in Tsuruga, Fukui Prefecture, to the Nuclear Regulation Authority (NRA).

- 【Related】Atomic energy agency submits Monju reactor decommissioning plan
- 【Related】Monju reactor set for decommissioning lacks sodium removal method
- 【Related】Editorial: Radiation exposure accident a result of JAEA's sloppy safety management

The Monju reactor uses liquid sodium as a coolant, which reacts violently when exposed to water or air. There has never been a reactor like the Monju unit in the country, and so there is no precedent for decommissioning it. In short, this will be a very tough road, strewn with many obstacles.
In addition to giving the JAEA's proposal a vigorous vetting, it is essential that the NRA keep a careful watch on the plan's progress after approval.
According to the JAEA's plan, the Monju decommissioning will take 30 years, wrapping up in fiscal 2047. The work will be broken into four phases, with phase one -- including removal of the reactor fuel assemblies -- set for completion in fiscal 2022. In phase two and after, the JAEA will remove the

radioactive sodium coolant and dismantle the Monju facility. The estimated cost for all this is about 375 billion yen.
However, there is currently only a detailed work schedule for phase one. Furthermore, Fukui Prefecture has demanded the spent reactor fuel be moved outside its borders, but there is as yet no place for it to go. Moreover, the decommissioning plan has no blueprint for how to get the sodium coolant out of the reactor, so the exact nature of the process has yet to be determined. The JAEA says that extracting the coolant is "sufficiently technically feasible," but NRA Chairman Toyoshi Fuketa has said that the JAEA "is being overly optimistic if it thinks it can do it just by going ahead with the project."
It was the JAEA's mismanagement of the Monju reactor, its repeated scandals including inspection oversights, which triggered the reactor's decommissioning in the first place. It is perfectly natural that the Fukui Prefectural Government is expressing misgivings about leaving the project in the hands of such an organization.
The central government will establish a committee to explain the structure and progress of the Monju decommissioning project to local residents. However, it should also reveal the information to the broader Japanese public, and be subject to its assessment.
France has already shuttered its fast-breeder reactors, and we would like to see Japan make the most of French experience and technology to help guarantee the Monju decommissioning is undertaken safely and soundly.
To date, development of the Monju fast-breeder reactor has cost the public purse over a trillion yen, though the unit has spent just 250 days on line. The cost of decommissioning the plant may also mount. Meanwhile, the Rokkasho nuclear fuel reprocessing plant in Aomori Prefecture -- another vital link in the government's fuel cycle plan -- has no immediate prospects of going into full operation.
The government began revamping its basic energy plan this past summer. The present proposal states that reliance on nuclear power will be reduced as much as possible. If that is indeed the goal, then first the government must decide once and for all that the stalled nuclear fuel cycle program needs to be reconsidered.

December 23, 2017

Delayed again

Japanese nuclear fuel reprocessing plant delayed yet again

https://asia.nikkei.com/Politics-Economy/Policy-Politics/Japanese-nuclear-fuel-reprocessing-plant-delayed-yet-again?n_cid=NARAN012

TOKYO -- The Japanese company building a reprocessing plant for spent nuclear fuel pushed back the planned completion date by another three years Friday, further clouding prospects for realizing the nuclear fuel cycle sought by the energy-poor country.
Japan Nuclear Fuel said it now expects to finish the facility in Rokkasho, Aomori Prefecture, in the first half of fiscal 2021, citing problems with aging equipment that forced the suspension of safety checks by the Nuclear Regulation Authority. **The deadline has been postponed 23 times from the original target of 1997.**
Executive President Kenji Kudo apologized Friday to Aomori Vice Gov. Ikuo Sasaki and said his company would work as one to follow the new timetable at all costs.
Sasaki warned that the series of problems at the plant, stemming from age-related deterioration and insufficient inspections, "could cause residents to lose trust in the facility's safety."

The reprocessing plant is meant to extract uranium and plutonium from spent nuclear fuel for reuse in reactors, making it a key link in the envisioned nuclear fuel cycle. Work on the Rokkasho facility began in 1993, but it has sat idle for more than two decades, and many parts are deteriorating with age. Rainwater leaked into a building housing an emergency power supply, and corrosion ate holes in exhaust pipes at a uranium enrichment facility.
The cost of the Rokkasho plant, including operating expenses, has climbed to 13.9 trillion yen ($122 billion), and repair costs may push the total even higher. The necessary funds are provided by the big power companies that are Japan Nuclear Fuel's main shareholders, feeding growing criticism that the burden falls indirectly on consumers.
The government decided last year to scrap the Monju experimental fast-breeder nuclear reactor, another part of the fuel-cycle plan.
Kudo acknowledged the excessive number of delays and said he would accept the criticism levied at his company. "We want to complete [the facility] at the earliest possible date," he said.
But it remains unclear whether three additional years will be enough to bring the plant in line with tough new standards imposed after the Fukushima Daiichi disaster.

January 17, 2018

Time to reconsider reprocessing

Editorial: Turn renewal of Japan-US nuclear pact into chance to reconsider reprocessing

https://mainichi.jp/english/articles/20180117/p2a/00m/0na/005000c

A 30-year nuclear cooperation agreement between Japan and the U.S. that expires in July is set to be automatically renewed. The renewal is accompanied by the U.S. government's continued approval of Japan's reprocessing of spent nuclear fuel.

- 【Related】Japan, US decide against reviewing atomic energy accord to maintain status quo
- 【Related】Day after ICAN Nobel ceremony, Suga reiterates Japan will not sign nuke ban treaty
- 【Related】Gov't set to continue nuclear fuel cycle project despite Monju closure

The extension of the pact, officially known as the Agreement for Cooperation Between the Government of the United States of America and the Government of Japan Concerning Peaceful Uses of Nuclear Energy, may be desirable in the short term to the Japanese government, which wants to maintain its nuclear power policy. But it only serves to deepen the contradictions in Japan's fuel reprocessing policy, in terms of both its energy policy and efforts to prevent the proliferation of nuclear weapons. Additionally, the accord will have an unstable status following the renewal, allowing either party to end it with six months' notice. Instead of passively renewing the agreement, Japan should be using the pact's impending expiry date as an opportunity to change course on its fuel reprocessing policy.
The Japanese government has upheld the nuclear fuel cycle -- in which plutonium that is extracted from spent nuclear fuel is reused as fuel in nuclear reactors -- as a national project. Even after the disaster at the Fukushima No. 1 Nuclear Power Plant broke out, the government has not changed its policy of reprocessing all spent nuclear fuel.
Pluthermal power generation, which entails plutonium being burned, is currently being conducted in two light-water nuclear reactors, but has not been economically efficient. The nuclear fuel cycle was meant to be realized through a fast-breeder reactor cycle, but the government's decision to decommission the Monju prototype fast-breeder reactor has effectively signaled the project's failure.

Many major countries such as the U.S., the U.K. and Germany have pulled out of their respective nuclear fuel cycle projects.
Despite this state of affairs, Japan possesses, both in Japan and overseas, 47 metric tons of plutonium that it obtained through fuel reprocessing. Furthermore, it maintains plans to finish building a nuclear reprocessing plant in the Aomori Prefecture village of Rokkasho, which would allow the extraction of up to 8 tons of plutonium per year from spent nuclear fuel.
From the standpoint of preventing the proliferation of nuclear arms, it is highly problematic to be in possession of massive volumes of plutonium -- which can be used to build nuclear weapons -- without having specific plans for its consumption. It would only cause heightened tensions with China and South Korea, and it's only natural that it has drawn concerns from the U.S. Moreover, there's no denying the possibility of such stockpiles becoming the target of terrorist attacks.
The completion of the Rokkasho reprocessing plant's construction has now been delayed for the 24th time, to at least three years from now. It is important to take this as an opportunity to freeze reprocessing plants, and reconsider withdrawing entirely from the fuel cycle project.
To do so, however, we must address what will happen to the spent fuel in Aomori Prefecture. For now, spent nuclear fuel is considered a resource. But it turns into radioactive trash if Japan decides to stop reprocessing. If the fuel cycle project were to be stopped, the Aomori Prefectural Government is bound to demand that spent nuclear fuel be taken in by nuclear power plants around the country.
There is no way out of this problem without the government bearing down to pursue a long-term solution. We urge the government to thoroughly discuss options in its basic energy plan's revision process that is currently underway.

January 19, 2018

EDITORIAL: Japan should not pursue nuke fuel reprocessing despite U.S. OK

http://www.asahi.com/ajw/articles/AJ201801190017.html

Japan’s agreement with the United States on bilateral cooperation in civilian uses of nuclear power will be automatically renewed when its 30-year term expires in July.
As neither of the two governments sought to renegotiate the deal half a year prior to the expiration date, the current agreement will remain in place as is.
All of Japan’s nuclear power projects, from nuclear power plants to research and development projects concerning atomic energy, are based on this agreement.
The most notable feature of the pact is that it allows Japan to reprocess spent fuel from nuclear power plants to extract plutonium.
But the fact that the agreement allows Japan to reprocess spent nuclear fuel should not be used by the Japanese government as a pretext for pursuing a reprocessing program.
Japan already has enough plutonium to make some 6,000 atomic bombs similar to the one dropped on Nagasaki in August 1945.
Japan has no plausible plan to reduce its stockpile.
The nuclear reprocessing plant the Japanese power industry is building in Rokkasho, Aomori Prefecture, should not be brought online.
The situation requires fresh debate on the project to determine whether the construction should be terminated.
In the negotiations for the previous revision to the bilateral nuclear cooperation agreement, Tokyo focused on persuading Washington to grant it the right to reprocess spent nuclear fuel.
At that time, the Japanese government believed the resource-poor Japan could solve its energy supply problem by pursuing a nuclear fuel recycling program based on technology to extract plutonium from

spent nuclear fuel and burn it in fast breeder reactors, which are supposed to generate more fissile material than they consume.
It has become clear in the past three decades, however, that nuclear fuel recycling is neither safe nor economical. Most industrial nations have abandoned this idea.
In 2015, Japan decided to decommission the Monju prototype fast breeder reactor. The decision has effectively destroyed Japan's hopes of establishing a nuclear fuel recycling system.
Japan currently has some 47 tons of plutonium including amounts extracted in Britain and France for Japan under reprocessing contracts.
The Japanese government and the power industry entertain the idea of mixing such plutonium with uranium for burning in ordinary reactors. But most of the operable nuclear reactors in Japan have been offline since the 2011 Fukushima nuclear disaster.
Under the U.N. Treaty on the Non-Proliferation of Nuclear Weapons, Japan is the only country without nuclear arms that is allowed to reprocess spent nuclear fuel.
Japan's privilege is conditioned on its commitment to using plutonium only for peaceful purposes. As things now stand, it is difficult for Japan to dispel international suspicion about its intentions concerning the massive stockpile of plutonium no matter how strongly it may stress its commitment to peaceful use of the material.
The Cabinet Office's Atomic Energy Commission has started considering the adoption of an avowed policy of extracting only the amount of plutonium the country will actually use.
But this is a seriously delayed response to international criticism based on an unreasonably optimistic assessment of the situation, which argues strongly against any attempt by Japan to extract fresh plutonium.
Japan should start serious and concrete efforts to reduce its stockpile of plutonium in line with its international promise not to hold any surplus plutonium.
Transferring the material to Britain and France and asking the United States to develop a viable disposable method are ideas that merit serious consideration.
The reprocessing plant in Rokkasho was originally scheduled to be completed in 1997. But the time frame was moved back again late last year, by some three more years to the first half of fiscal 2021, in the 23rd postponement.
The project has been plagued by a slew of problems and troubles and the estimated construction cost has nearly quadrupled from the original estimate to 2.9 trillion yen ($26.12 billion).
What should be done with the project is obvious.

January 27, 2018

Monju de-fueling to start in July

JAEA to begin defueling troubled Monju reactor in July

https://www.japantimes.co.jp/news/2018/01/27/national/jaea-begin-defueling-troubled-monju-reactor-july/#.Wmzjb3wiGos

Jiji — The Japan Atomic Energy Agency plans to start work in July to de-fuel its experimental Monju fast-breeder reactor in Tsuruga, Fukui Prefecture, it was learned Friday.
JAEA put forward the plan at a meeting of the Nuclear Regulation Authority the same day.
Monju is scheduled to be decommissioned in light of the long history of problems with the prototype fast-breeder reactor.
At Monju, 370 fuel assemblies are being cooled in sodium within the reactor and 160 others are being stored in an outdoor pool.

The JAEA plans to first transfer 100 of the fuel assemblies from the outside pool to a safer pool by the end of the year, with all 530 assemblies to be transferred by December 2022.
The de-fueling work will take place in the five-year first phase of the 30-year decommissioning process, which is scheduled to last through the end of March 2047.

March 28, 2018

NRA approves end of Monju

Japan Regulator Approves Monju Decommissioning Plan, Say Reports

https://www.nucnet.org/all-the-news/2018/03/28/japan-regulator-approves-monju-decommissioning-plan-say-reports

Japan's Nuclear Regulation Authority (NRA) has approved a 30-year plan to decommission the prototype Monju fast breeder reactor in Fukui Prefecture, southwest Japan, reports in local media said. The Japan Atomic Energy Agency (JAEA), Monju's operator, filed a decommissioning application with the NRA in December 2017, while a basic decommissioning plan was approved by a Japanese government commission in June 2017.

According to the Japanese daily Mainichi, the approved plan calls for dismantling the reactor in four phases, beginning with the removal of 530 spent fuel rods from the reactor core between fiscal 2018 and fiscal 2022 and ending with the demolition of the reactor building by fiscal 2047.

However, Mainichi said the plan does not define how 760 tonnes of radioactive sodium coolant will be extracted from Monju and what the final destination for the spent fuel will be.

Tokyo-based industry group Japan Atomic Industrial Forum said last year that the government has not yet specified any destination for the spent fuel. Jaif said officials will work out details of a transportation plan before the fuel is completely removed from the reactor.

Monju is a 246-MW sodium-cooled fast reactor designed to use mixed fuel rods of uranium and plutonium and to produce more fissile material than it consumes. Monju reached criticality for the first time in 1994, but it has mostly been offline since 1995 when 640 kg of liquid sodium leaked from a cooling system, causing a fire.

Monju was allowed to restart in May 2010 after JAEA carried out a review of the plant's design, and its safety procedures, which were shown to be inadequate. However, operation was again suspended in August 2010 after a fuel handling machine was dropped into the reactor during a refuelling outage. Japan's government decided to permanently shut down the reactor in 2016.

Decommissioning and dismantling costs are estimated at $3.2bn.

April 4, 2018

Rokkasho: Safety checks to resume

Checks of trouble-prone nuclear fuel reprocessing plant to resume

https://mainichi.jp/english/articles/20180404/p2g/00m/0dm/059000c

TOKYO (Kyodo) -- Nuclear regulators on Wednesday decided to resume assessing the safety of a spent fuel reprocessing plant in northeastern Japan after suspending the process for several months following revelations about the operator's lax safety management.

Clearing the safety checks is a requirement for Japan Nuclear Fuel Ltd. to start operating its plant in Rokkasho, Aomori Prefecture. **It was originally scheduled for completion in 1997 but has pushed the timeline back 24 times despite the facility being slated to play a key role in Japan's nuclear fuel recycling policy.**

What would be Japan's first commercial nuclear reprocessing plant is designed to handle up to 800 tons of spent nuclear fuel per year, extracting about 8 tons of plutonium to reuse as nuclear fuel.

Japan Nuclear Fuel applied for the state safety assessment in 2014, seeking to meet tougher standards introduced in the wake of the 2011 Fukushima Daiichi nuclear power plant disaster that was triggered by a massive earthquake and tsunami.

But in August last year, about 800 liters of rainwater was found to have seeped into a building housing key emergency power sources because the operator had failed to notice that equipment to keep the building watertight was aging. The equipment had not been checked for about 14 years.

The findings led the Nuclear Regulation Authority to level harsh criticism at the safety management record of Japan Nuclear Fuel. The review process was halted in October, with the operator saying it will prioritize inspections of all facilities at the plant.

The company's latest timeline had aimed for the reprocessing plant to be completed in the first half of fiscal 2018, but it said in December that it will push back the schedule by three more years.

60 years after, the unfulfilled promise of breeder reactors

Background:

Even before two A-Bombs were dropped on Japan in 1945, starry-eyed nuclear scientists were planning for a future world in which plutonium and thorium would become the principal energy resources of human society, replacing uranium as a nuclear fuel. This dreamy-eyed vision has always been considered of paramount importance to the future of nuclear energy — and nuclear weaponry.

The only naturally-occurring element that can be used as a nuclear explosive in an A-Bomb or as fuel for a nuclear reactor, is a rare type of uranium called uranium-235 (U-235). When uranium deposits are found in nature, only 7 uranium atoms out of a thousand are U-235. Virtually all of the other uranium atoms are of a different type called uranium-238 (U-238).

U-238 is a "non-fissile" variety of uranium, often called "depleted uranium" (DU). U-238 is far more abundant than U-235, but it cannot be used as a nuclear explosive or as fuel for a nuclear reactor. Similarly, Thorium-232 (Th-232) is a naturally-occurring element three times more abundant than U-238, but it is not fissile either.

However, there's a trick that nuclear scientists learned way back in the early 1940s. It's a way to make U-238 and Th-232 "breed" new elements -- human-made, artificial elements — that are fissile, and perfectly suited for use in nuclear reactors or nuclear weapons. For this reason, U-238 and Th-232 are said to be "fertile" elements, because they breed fissile materials.

When an atom of uranium-238 absorbs a neutron, it becomes an atom of plutonium-239. And when an atom of thorium-232 absorbs a neutron, it becomes an atom of uranium-233. Both of these human-made materials, plutonium-239 and uranium-233, are fissile — they are both

excellent candidates to be used as an explosive in nuclear weapons or as fuel for nuclear reactors. Neither of them occurs in nature. They are human-made.
Breeder reactors are specifically designed to breed large quantities of plutonium-239 and/or uranium-233 in order to extend the supply of fissile materials, which — unless replenished — will not long outlast the world's oil supplies. There is simply not enough uranium-235 to allow nuclear power to replace a significant amount of the world's oil consumption. At present, nuclear power produces about 11 percent of global electricity, but that's less than 2 percent of the world's energy use (most of which is non-electrical).
Up to the present time, most breeder reactors have been built to mass-produce plutonium-239, although breeding uranium-233 using thorium-232 as a "starter" has been repeatedly tried. At Chalk River, for example, in the late 1940 and early 1950s, there were two "reprocessing plants" — one to extract plutonium-239 from irradiated uranium fuel rods, and one to extract uranium-233 from irradiated thorium rods. (You can't call them "fuel rods" because thorium is not a fuel.)
One of the biggest worries associated with breeder reactors is the very real danger of the proliferation of nuclear weapons — not only spreading these doomsday devices to other countries, but also to terrorist groups and criminals. For plutonium and uranium-233 are very powerful nuclear explosive materials, and if stolen or diverted can be fabricated into formidable nuclear explosive devices that can be delivered to their targets in any number of ways -- even in the trunk of an auto.
Such is not the case with today's nuclear power reactors. Normal uranium reactor fuel cannot be used as a nuclear explosive because there is too much uranium-238 mixed with the uranium-235, and there is no practical way to easily or quickly remove the U-238. The situation would change drastically if plutonium or uranium-233 were used as reactor fuel, for such fuel could readily be converted to a powerful nuclear explosive.
Many breeder reactor programs around the world have failed. The Fermi-1 reactor just outside Detroit was an experimental breeder that suffered a partial meltdown and was scrapped; it was the subject of the book "We Almost Lost Detroit". The Superphénix in France was a breeder reactor that was a spectacular failure at the time and marked the beginning of the decline of the French nuclear power industry. The SMR-300 breeder reactor in Germany was abandoned without ever operating. Nevertheless, interest in breeder reactors continues because without it the nuclear enterprise has no long-term future. Some of the small modular reactors (SMRs) currently proposed are breeders.
In 2010 the International Panel on Fissile Materials ***said "After six decades and the expenditure of the equivalent of tens of billions of dollars, the promise of breeder reactors remains largely unfulfilled and efforts to commercialize them have been steadily cut back in most countries". In Germany, the United Kingdom, and the United States, breeder reactor development programs have been abandoned.***
Now Japan has joined the parade, abandoning its Monju breeder reactor for good.
Gordon Edwards,

April 6, 2018

Monju Breeder Reactor Abandoned

Japan prepares to shut down its troubled 'dream' nuclear reactor

https://asia.nikkei.com/Politics/Japan-prepares-to-shut-troubled-dream-nuclear-reactor
or https://nuclear-news.net/2018/04/06/the-end-for-japans-expensive-monju-nuclear-fast-breeder-dream/

Decades-old plant has cost almost
$10 billion and hardly ever operated
KAZUNARI HANAWA, Nikkei staff writer

TOKYO — Japan is set to start decommissioning its troubled Monju fast-breeder reactor after decades of accidents, cost overruns and scandals. It is the beginning of the end of a controversial project that exposed the shortcomings of the country's nuclear policy and the government's failure to fully explain the risks and the costs.

In July, the Japan Atomic Energy Agency will begin decommissioning what was hailed as a "dream" reactor that was expected to produce more nuclear fuel than it consumed. The government has so far spent more than 1 trillion yen ($9.44 billion US) on the plant, which has barely ever operated.

The plan approved by the Nuclear Regulation Authority on March 28 to decommission the reactor, located in central Japan's Fukui Prefecture, calls for the extraction of spent nuclear fuel to be completed by the end of the fiscal year through March 2023. Full decommissioning is expected to take about 30 years.

Total costs to shut down the reactor are currently estimated at 375 billion yen, but that could climb, as the full technical requirements and the selection of the nuclear waste sites are not well understood. Japan does not have the technological ability to manage the decommissioning process on its own, and must enlist the help of France, which has more experience with fast-breeder reactors. Among the technical challenges is handling the plant's sodium coolant, which is highly reactive and explodes on contact with air.

Many of the problems with Japan's nuclear policy were brought to light by the Fukushima Daiichi nuclear disaster caused by the tsunami and earthquake of March 2011. Such problems have included the high costs of plants, the selection of nuclear disposal sites, and the threat of shutdowns due to lawsuits. Japan's nuclear policy has largely been gridlocked since the disaster.

But the Monju project had many problems before the Fukushima catastrophe.

Planning for the project began in the 1960s. Its fast-breeder technology was considered a dream technology for resource-poor Japan, which had been traumatized by the oil crisis of the 1970s. The reactor was supposed to generate more plutonium fuel than it consumed.

The reactor finally started operating in 1994, but was forced to shut down the following year due to a sodium leak. It has been inoperative for most of the time since. The decision to decommission it was made in December 2016 following a series of safety scandals, including the revelation that many safety checks had been omitted.

Recent experience suggests the government's estimated cost of 375 billion yen to decommission Monju could be on the low side. In 2016, the estimate for decommissioning the Fukushima Daiichi plant ballooned to 8 trillion yen *[$74.8 billion US]* from an initial 2 trillion yen in 2013, largely due to inadequate understanding of the decommissioning process.

While "the JAEA will try to keep costs down," said Hajime Ito, executive director with the agency, the process of extracting sodium, the biggest hurdle, has yet to be determined. Future technical requirements will also involve significant costs.

The Monju reactor is not the only example of failure in Japan's nuclear fuel cycle policy — the cycle of how nuclear fuel is handled and processed, including disposing nuclear waste and reprocessing used fuel.

Central to this policy is a nuclear fuel reprocessing plant in the village of Rokkasho in northern Aomori Prefecture that was supposed to extract plutonium and uranium by reprocessing spent nuclear fuel to be reused at nuclear plants.
More than 2 trillion yen *[$18.7 billion US]* has been spent on the plant so far. Construction was begun in 1993, but completion has been repeatedly postponed due to safety concerns. On Wednesday, the NRA decided to resume safety checks on the plant, but if it chooses to decommission it, the cost would be an estimated 1.5 trillion yen *[$14 billion US]* .
Had Japan taken into consideration the costs of decommissioning plants and disposing of spent nuclear fuel, it probably would not have been able to push ahead with its nuclear policy in the first place, said a former senior official of the Ministry of Economy, Trade and Industry, who was involved in formulating the country's basic energy plan.

May 12, 2018

Monju wasn't worth it

Japan nuclear research project did not pay off: auditors

https://mainichi.jp/english/articles/20180512/p2g/00m/0dm/030000c#cxrecs_s

TOKYO (Kyodo) -- Japan's nuclear research project using a fast-breeder reactor did not yield sufficient results despite taxpayer money spent on it, state auditors said Friday.

- 【Related】Editorial: Monju reactor will be decommissioned, but mountain of uncertainty remains
- 【Related】Monju reactor set for decommissioning lacks sodium removal method
- 【Related】Monju fast-breeder reactor operator insiders say project is a failure: survey

The project involving the trouble-plagued Monju prototype reactor, developed to play a key role in fuel recycling, only achieved 16 percent of the planned results while costing the government at least 1.13 trillion yen ($10.3 billion), the Board of Audit of Japan said.
The government has already decided to scrap the reactor, estimating an additional cost of 375 billion yen. But the board noted that the 30-year decommissioning plan could cost more.
The reactor, designed to produce more plutonium than it consumes while generating electricity, barely operated over the past two decades as it experienced a series of problems, including a leakage of sodium coolant and equipment inspection failures.
"Flawed maintenance led to the decommissioning," the auditors concluded in their report.
But the report also brought into the spotlight the absence of systematic evaluation of the project by the auditors as they expressed their opinion on Monju's research and development costs only once in 2011.
Monju was only up and running 250 days after starting operations in 1994, failing to complete test items, according to the report.
On the scrapping cost, the report said it could expand because the current estimate does not include personnel costs and taxes, while noting that the cost of removing the radioactive sodium coolant could change.

May 31, 2018

Reprocessing in N. Korea?

N.Korea may be preparing to reprocess spent fuel

https://www3.nhk.or.jp/nhkworld/en/news/20180531_20/

US researchers say satellite images of a North Korean nuclear facility may be showing signs of possible preparation for reprocessing of spent nuclear fuel.

The researchers released on Wednesday their analysis of satellite images taken on May 6th of the facility in Nyongbyon on their website "38 North."

They say there was a light smoke plume emanating from the stack of a thermal plant at the facility and coal bins had been partially filled and groomed.

The researchers say that in the past, such activity signaled initial preparations for a reprocessing campaign, which involves extracting plutonium.

But the researchers also say it remains unclear if that is the case because there is no sign of the specialized railcars nearby that were present in past preparations.

Earlier this year, the research group said a reactor at the facility may have been restarted since last year. In their analysis of satellite imagery taken in February 2018, they said North Korea may have resumed production of plutonium.

ASTRID program scaled back: What does this mean for Japan?

Scaling back of French reactor a blow for nuke fuel reprocessing

http://www.asahi.com/ajw/articles/AJ201805310040.html

Japan's hopes of keeping its nuclear fuel recycling program alive faces another major obstacle with signs from France that a reactor project there will be scaled back because of swelling construction costs.
After the nuclear fuel recycling program suffered a heavy blow with the decision in late 2016 to decommission the Monju prototype fast-breeder reactor, government officials turned to France's ASTRID program as an alternative information source for the fuel recycling plan.
But French government officials said the Advanced Sodium Technological Reactor for Industrial Demonstration will have its planned power generation scaled back from the initial plan of 600 megawatts of electricity to between 100 and 200 megawatts.
The major aim of the nuclear fuel recycling program is to reprocess spent nuclear fuel to extract plutonium, which would be used to create mixed-oxide fuel that could be burned in nuclear reactors. Government officials had hoped to use various technologies emerging from the ASTRID program to eventually construct a demonstration fast reactor in Japan. But a scaled-back ASTRID would mean knowledge needed for the demonstration reactor would not be available.

According to several government sources, French government officials informed their Japanese counterparts of the planned reduction in the ASTRID power generation plan due mainly to the high construction costs.
French officials also inquired about the possibility of Japan shouldering half the ASTRID construction burden, which could run anywhere between several hundreds of billions of yen to about 1 trillion yen ($9.2 billion).
Plans call for constructing the ASTRID in France with construction to start sometime after 2023.
Much like the Monju prototype reactor, liquid sodium would be used as a coolant in the ASTRID, which is designed to more easily burn plutonium as a fuel. Since the ASTRID would be a demonstration reactor that is one stage ahead of the Monju prototype, it would be closer to realization as a commercial reactor.
When the government decided to decommission the problem-plagued Monju, it also decided to construct a demonstration fast reactor in Japan to maintain its nuclear fuel recycling program.
The ASTRID initially was expected to provide valuable data for the future demonstration fast reactor by achieving complete power generation, a stage the Monju prototype never reached, as well as know-how related to maintenance, management and safety measures.
But if the ASTRID is scaled back, one official involved in the program in Japan said, "It would become more difficult to explain to the public why money was being funneled into the (ASTRID) demonstration reactor that was smaller in scale than the Monju prototype reactor."
The Monju was designed to generate 280 megawatts of electricity.
The government is planning to compile a road map for the next decade concerning development of a domestic fast reactor before the end of the year.
Even some officials of the Ministry of Economy, Trade and Industry, which has been promoting the nuclear fuel recycling program, have raised doubts about participating in the ASTRID program.
Concerns are also being raised among lawmakers in the ruling Liberal Democratic Party, with one executive wondering if cooperating with the ASTRID program could end up much like the Monju project, which wasted more than 1 trillion yen following a spate of accidents and other problems.
(This article was written by Tsuneo Sasai, Shinichi Sekine and Rintaro Sakurai.)

June 13, 2018

Scrapping the Tokai plant over 70 years at taxpayers' expense

Japan approves 70-year plan to scrap nuclear reprocessing plant

https://www.japantimes.co.jp/news/2018/06/13/national/japan-approves-70-year-plan-scrap-nuclear-reprocessing-plant/#.WyEjP4oyWos

Kyodo
Japan's nuclear watchdog approved a plan Wednesday to scrap a nuclear fuel reprocessing plant northeast of Tokyo over a 70-year period, with the cost projected at ¥1 trillion ($9 billion).
The facility in the village of Tokai, Ibaraki Prefecture, went into operation in 1977. It was Japan's first spent-fuel reprocessing plant built under the nation's nuclear fuel cycle policy, which aims to reprocess all spent nuclear fuel in order to reuse the extracted plutonium and uranium as reactor fuel in the resource-scarce country.
But the policy has run into a dead end as the completion of a separate fuel reprocessing plant in Aomori Prefecture, built using technological expertise developed through the Tokai plant, has been delayed by more than 20 years.

The decommissioning cost will be shouldered by taxpayers as the Japan Atomic Energy Agency, which operates the Tokai plant, is backed by the state. Where to store the waste accumulated at the plant is undecided. In 2014, the agency decided to decommission the plant due to its age and the huge costs of running it under stricter safety rules introduced after the 2011 Fukushima nuclear crisis.
According to the plan approved by the Nuclear Regulation Authority, around 310 canisters of highly radioactive, vitrified waste and some 360 cubic meters of radioactive water are currently stored at the facility.
Spending of about ¥770 billion has been estimated for the disposal of such waste and decommissioning of the facility, and roughly ¥217 billion for the 10-year preparation work.
The Tokai facility, which reprocessed a total of 1,140 tons of spent nuclear fuel, has been monitored by the International Atomic Energy Agency, as the extracted plutonium could be repurposed for other uses.
Due to the scrapping of the Tokai plant, the agency has delayed transportation of spent nuclear fuel from its Fugen prototype advanced converter reactor in Tsuruga, Fukui Prefecture, by nine years, to fiscal 2026.
The Tokai facility received some of the fuel from the Fugen reactor, which operated between 1979 and 2003, but destinations for the remaining fuel have yet to be decided. The agency has been looking to transport it overseas.
Japan's nuclear fuel recycling efforts have not paid off, with the troubled Monju prototype fast-breeder nuclear reactor set to be decommissioned over the next 30 years. The reactor in Fukui has barely operated over the past two decades despite the state investing ¥1 trillion.

June 18, 2018

Scaling down ASTRID project: What does this mean for Japan?

EDITORIAL: Japan should disconnect from fast-breeder reactor project

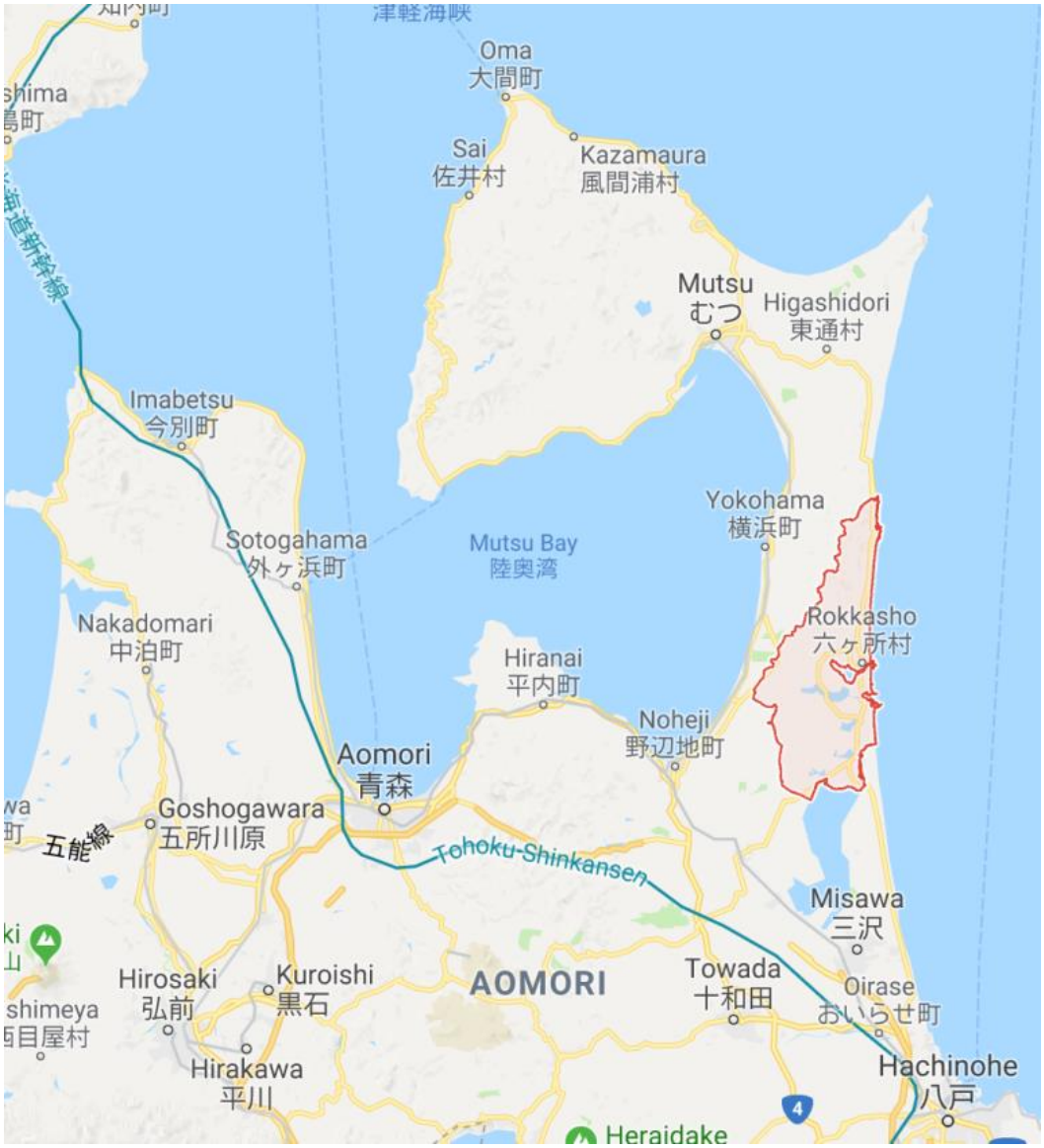
http://www.asahi.com/ajw/articles/AJ201806180025.html

France has decided to sharply scale down its ASTRID fast-reactor project, which is supported by Japan. France's decision underscores afresh the dismal outlook of Japan's plan to continue the development of fast-reactor technology by relying on an overseas project.
Now that it has become unclear whether participation in the ASTRID project will pay off in future benefits that justify the huge investment required, Japan should pull out of the French undertaking.
Fast reactors are a special type of nuclear reactors that burn plutonium as fuel. The ASTRID is a demonstration reactor, the stage in reactor technology development just before practical use.
The French government has said the Advanced Sodium Technological Reactor for Industrial Demonstration, if it comes on stream, will generate 100 to 200 megawatts of electricity instead of 600 megawatts as originally planned. Paris will decide in 2024 whether the reactor will actually be built.
Japan has been seeking to establish a nuclear fuel recycling system, in which spent nuclear fuel from reactors will be reprocessed to extract plutonium, which will then be burned mainly in fast reactors.
When the Japanese government in 2016 pulled the plug on the troubled Monju prototype fast-breeder reactor, which was at the technology stage prior to that of a demonstration reactor, it decided to make the joint development of the ASTRID the centerpiece of its plan to continue the nuclear fuel recycling program.

The government will provide some 5 billion yen ($45.2 million) annually for the French project through the next fiscal year, which starts in April, and decide, by the end of this year, whether and how it will be involved in the project after that.
Because of significant differences in the roles of prototype and demonstration reactors, a simple comparison between the Monju and the ASTRID can be misleading.
But it is clearly doubtful whether the ASTRID, which will be smaller than the Monju, will offer sufficient benefits for Japan's fuel recycling program.
If it fully commits itself to the joint development of the ASTRID in response to France's request, Japan will have to shoulder half the construction cost, estimated to be hundreds of billions to 1 trillion yen, and assign many engineers to the project. But these resources could end up being wasted.
Over the years, the government spent more than 1.1 trillion yen of taxpayer money on the Monju, designed to be a small-scale example of the potential of the fast-breeder reactor technology. But the prototype reactor remained out of operation for most of the two decades after it became operational. It actually accomplished only a small fraction of what it was designed to achieve.
The government should make an early decision to end its involvement in the ASTRID to avoid repeating the mistake it made with the Monju project, which was kept alive at massive cost for far too long as the decision to terminate it was delayed for years without good reason.
The government has only itself to blame for the current situation. Despite deciding to decommission the Monju, it stuck to the old fuel cycle policy without conducting an effective postmortem on the Monju debacle. Instead, the government too readily embraced the ASTRID project as a stopgap to keep its fast-reactor dream alive.
The government needs to rigorously assess whether it is wise to continue developing fast-reactor technology.
Producing electricity with a fast reactor is costlier than power generation with a conventional reactor that uses uranium as fuel. The United States, Britain and Germany phased out their own fast-reactor projects long ago.
France has continued developing the technology, but feels no urgent need to achieve the goal. The country predicts that the technology will be put to practical use around 2080 if it ever is.
Even if Japan wants to continue developing fast-reactor technology, it would be extremely difficult to build a demonstration reactor for the project within the country given that even finding a site to build an ordinary reactor is now virtually impossible.
The government would be utterly irresponsible if it aimlessly keeps pouring huge amounts of money into the project when there is no realistic possibility of the technology reaching the stage of practical application.
If it abandons the plan to develop fast-reactor technology, the government will have to rethink the entire nuclear fuel recycling program.
Any such fundamental change of the nuclear power policy would have serious implications. But there is no justification for postponing the decision any further.

June 10, 2018

Mayor election in Rokkasho & nuclear risk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今別町
Yokohama
横浜町
Sotogahama
外ヶ浜町
Mutsu Bay
陸奥湾
Rokkasho
六ヶ所村
Nakadomari
中泊町
Hiranai
平内町
Noheji
野辺地町
Aomori
青森
Goshogawara
五所川原
五能線
Tohoku-Shinkansen
Misawa
三沢
AOMORI
Towada
十和田
Oirase
おいらせ町
Hirosaki
弘前
Kuroishi
黒石
Hirakawa
平川
Hachinohe
八戸
Heraidake

Mayor election in Rokkasho Village, Aomori Prefecture, Japan: A small village where world nuclear risk is at stake.

https://fukushima311voices.com/2018/06/10/mayor-election-in-rokkasho-village-aomori-prefecture-japan-a-small-village-where-world-nuclear-risk-is-at-stake/

Don't let the Rokkasho nuclear fuel reprocessing plant start!
The Rokkasho village mayor election takes place on June 24, 2018.
We are calling for people to send encouraging comments for Ms Junko ENDO, anti-nuclear fuel cycle candidate!

For FB users, please write messages in the Facebook page of the candidate Ms Junko ENDO's political group "Rokkasho Mura ni atarashii kaze wo okosu kai" (Group to raise a new wind in Rokkasho Village)
The Facebook page is in Japanese, but you are most welcome to post your comments in your mother language. In fact, they prefer different foreign languages so that they can show that support is arriving from all over the world!

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Text below is partly based on an original text of Kiyohiko YAMADA with additions by Kurumi Sugita and Jon Gomon.

A brief historical and geographical reminder
There is a nuclear fuel cycle center in Rokkasho village, located at the root of Shimokita Peninsula in Aomori Prefecture, situated in the northernmost part of the main island of Japan.

On April 9, 1985, the governor of Aomori Prefecture decided to accept the center, composed of three facilities:

- a uranium enrichment (note 1) plant,
- a fuel reprocessing plant,
- and a low-level radioactive waste repository.

Afterwards, two facilities have been added:

- a temporary storage facility of high-level radioactive waste returned from overseas after reprocessing,
- and a MOX (note 2) fabrication plant.

Who is operating the nuclear fuel center?
This nuclear fuel cycle center of Rokkasho village is operated by Japan Nuclear Fuel Limited (JNFL), notorious for its incompetent management to say the least. In October 2017, Japanese Nuclear Regulation Autority (NRA) reported that JNFL violated safety measures. See a Mainichi Shimbun article below:
Unfinished nuclear fuel reprocessing plant faked safety records: NRA (Mainichi Shimbun, October 11, 2017)
" The NRA concluded on Oct. 11 that Japan Nuclear Fuel Ltd. (JNFL) has violated safety measures after it was learned that the firm failed to carry out the required checks and nevertheless continued to write down "no abnormalities" in safety check records. There has been a spate of incidents such as the flow of rainwater into facility buildings at the plant in the Aomori Prefecture village of Rokkasho.
The plant, which is scheduled to reprocess spent nuclear fuel, was on the verge of hosting a final-stage NRA safety inspection, but the checkup is likely to be postponed considerably as JNFL now has to prioritize in-house inspections of all facilities at the plant. "

Major problems of the Rokkasho reprocessing plant
The Japanese nuclear fuel cycle collapsed with the fast breeder reactor "Monju"

The Japanese government persisted to continue research and development on the fast breeder reactors, even though they had been abandoned elsewhere in the world. It was in December 2016 that the government decided to finally decommission the prototype reactor "Monju".
The government is still trying to start the operation of the Rokkasho reprocessing plant in the first half of 2021 fiscal year, even though the prospect of the fast breeder reactor's commercialization has become improbable. There is a contradiction here. Why start a reprocessing plant when there is no usage plan for the end product (see below as for Mox fuel usage)? One possible reason is that for quite a while former Liberal Democratic Party (LDP) ministers have been hinting at the possibility to possess nuclear weapons. They may want to have a plutonium extraction plant which can produce eight tons of plutonium annually.

Surplus Plutonium problem
The Japanese government has ordered the power companies to reprocess the total amount of used nuclear fuel resulting from nuclear power plants' operation. When there was no reprocessing plant in Japan, the reprocessing was entrusted to the UK and France. After that, a national reprocessing plant

was built in Tokai village in Ibaraki prefecture, and then the construction of the private reprocessing plant in Rokkasho village in Aomori Prefecture was started in 1993.
The total amount of plutonium remaining in these reprocessing plants is about 48 tons. Since the commercialization of the fast breeder reactor has become improbable, the government wants to use the plutonium as MOX fuel at nuclear power plants (called plu-thermal in Japan).
However, since the TEPCO Fukushima Daiichi nuclear accident of March 11, 2011, the plu-thermal project is not progressing and it has become difficult to use up the surplus plutonium. If the Rokkasho reprocessing plant is put in operation, it will create a surplus of eight tons of plutonium annually. The possession of such an amount of plutonium will most certainly increase tensions in Asia.

Risks involved in the Rokkasho plant

① The reprocessing plant is on a fault

Japan is riddled with geological faults, and there is no stable stratum. The Rokkasho reprocessing plant is not on a stable stratum at all. A big active fault of about 100 km lies in the Pacific Ocean side. Scientists warn that in case of a big earthquake, a magnitude 8 tremor could seriously damage the reprocessing plant.
The operating company insists that a big earthquake will not occur in Rokkasho, but their seismograph is installed on bedrock, and is set so that it does not indicate more than a seismic intensity 3. Why? It is because when seismic intensity higher than 3 is detected, it is necessary to make a total inspection of the reprocessing plant.

② Hakkoda and Towada volcanoes are nearby

Recently, Hakkoda Mountain and Lake Towada, major tourist destinations in Aomori Prefecture not far from the plant, came to be monitored as a possible origin of a volcano-related catastrophe.
With a volcanic eruption, cinders and volcanic ash can fall thick in the vicinity of the reprocessing plant. This may make it difficult to secure external power supplies, to drive emergency power vehicles, and/or to secure cooling water. In addition, if the small volcanic ash can clog filters and destroy equipment.

③ Fighter jets fly near Rokkasho

Within 30km of the Rokkasho reprocessing plant, there is Misawa Airbase used by the US Air Force and Japanese Air Self Defense Force. There is also the Amagamori bombing exercise ground within 10km. Fighter jets exercising in Amagamori fly over the Ogawara port, passing through the vicinity of the reprocessing plant to repeat the training.
There is no doubt that a major disaster will occur if a fighter plane crashes into the reprocessing plant. Considering that the reprocessing plant is planned to go into operation in the coming years, it is very unlikely that the US Misawa Airbase and exercise ground would be relocated before the reprocessing operation begins.

Possibility of a serious accident

In the reprocessing project application submitted by JNFL, the following list cites as possible serious accidents:
① criticality in the dissolution tank,
② criticality by a transfer error of the solution containing plutonium,
③ evaporation to dryness by the loss of the cooling function,
④ explosion caused by hydrogen generated by radiolysis,
⑤ an organic solvent fire in a cell of the plutonium refining facility,

⑥ the damage to the used fuel aggregates in the fuel storage pool,
⑦ leakage from piping of liquid high-level radioactive waste storage facilities to cells.
If any of these major accidents occur simultaneously, or if the accident is triggered by a crash of a fighter plane or a volcanic eruption, the scale of the accident would be more than prepared for. However, the range of nuclear disaster prevention of the reprocessing plant is limited to a radius of 5 km only.

Existing radiation exposure of the entire Aomori prefecture and of the Pacific Ocean is already too high

After the Fukushima Daiichi nuclear accident, many tanks were created on the site of the Fukushima nuclear power plant to store the tritium contaminated water after processing the radioactive water by the multi-nuclide removal facility (Advanced Liquid Processing System = ALPS). In Fukushima prefecture, tritium contaminated water is not discharged in the ocean because of the opposition of fishermen, while in Rokkasho the same tritium water was released in a large amount during the active testing. Fishermen in Iwate once required that the reprocessing plant drainage be discharged in Mutsu Bay and not in the Pacific Ocean. The person in charge in Aomori Prefecture refused, saying, "Mutsu Bay would die".

Because of all these risks which involve not only Rokkasho village or Aomori Prefecture but the whole world, we need the village mayor who says NO! to Rokkasho Nuclear Fuel Center. **Please write either in a FB page or leave your comment at the bottom of this blog article page which we will transfer.**

Reminder:
For FB users, please write messages in the Facebook page of the candidate Ms Junko ENDO's political group "Rokkasho Mura ni atarashii kaze wo okosu kai" (Group to raise a new wind in Rokkasho Village)
The Facebook page is in Japanese, but **you are most welcome to post your comments in your mother language**. In fact, they prefer different foreign languages so that they can show that support is arriving from all over the world!

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Profile and manifesto of the candidate Ms Junko ENDO in English coming up soon

June 17, 2018

What should be done with Japan's plutonium stockpiles?

Japan to cap plutonium stockpile to allay U.S. concerns

http://www.asahi.com/ajw/articles/AJ201806170027.html

Japan plans to boost measures to curb surplus plutonium extracted from the reprocessing of spent fuel at nuclear power plants, including capping the country's stockpile of the highly toxic material.
The move followed the U.S. and other countries' calls for Japan to reduce excess plutonium in light of nuclear nonproliferation and the threat of terrorist attacks involving nuclear materials.
The Cabinet Office's Japan Atomic Energy Commission will incorporate the measures in the five-point basic nuclear policy expected at the end of this month, the first revision in 15 years.

A reduction in the volume of plutonium held by Japan will also be specified in the government's basic energy plan, which will be revised next month.
Japan possesses about 10 tons of plutonium inside the country and about 37 tons in Britain and France, the two countries contracted to reprocess spent nuclear fuel. The total amount is equivalent to 6,000 of the atomic bomb that devastated Nagasaki in 1945.
In the policy, announced in 2003, the government vowed not to possess plutonium that has no useful purpose. The government has pledged not to have surplus plutonium to the International Atomic Energy Agency.
But the prospect for substantially curtailing the country's plutonium stockpile is becoming increasingly murky as the Monju prototype fast-breeder project has been abandoned.
The government decided in 2016 to decommission the Monju reactor in Tsuruga, Fukui Prefecture, which has seldom been in operation over the the past two decades due to a slew of problems.
Monju was designed to use plutonium recovered from spent fuel from other reactors as a key component of the government's nuclear fuel recycling program.
Japan can reprocess spent nuclear fuel under the Japan-U.S. Nuclear Cooperation Agreement.
The 30-year pact is expected to be automatically extended beyond its expiration on July 16.
After the expiration, however, the pact will be scrapped six months after either Japan or the United States notifies the other side of its intention to do so.
Foreign Minister Taro Kono has expressed concern about the "unstable" future of the agreement after July, and Japan has worked to meet a request from Washington to clearly spell out steps to reduce Japan's plutonium stocks.
The government's draft policy calls for allowing retrieval of plutonium strictly based on the projected amount to be used at conventional nuclear reactors as mixed plutonium-uranium oxide fuel, commonly known as MOX fuel.
It will also step up oversight on utilities with the aim of reducing the amount of plutonium to a level allowing the nuclear reprocessing plant under construction in Rokkasho, Aomori Prefecture, and other facilities to operate properly.
In addition, electric power companies will cooperate with each other in the use of MOX fuel, so that the amount of Japan's surplus plutonium that is now overseas will be reduced.
For example, Kyushu Electric Power Co. and Kansai Electric Power Co., two utilities that began using MOX fuel ahead of other utilities, will consider using more MOX fuel at their nuclear plants for the benefit of Tokyo Electric Power Co., whose prospect of bringing its Kashiwazaki-Kariwa nuclear power plant in Niigata Prefecture back on line remains uncertain.
When the 2.9 trillion yen ($26.37 billion) reprocessing plant in Rokkasho goes into full operation, about eight tons of new plutonium will be added annually as Japan's surplus plutonium.
The Federation of Electric Power Companies of Japan, an electric power industry group, estimates that MOX fuel should be used at 16 to 18 reactors to keep the amount of Japan's plutonium from rising.
But of nine reactors that have resumed operations following the introduction of more stringent safety standards after the Fukushima No. 1 nuclear disaster in 2011, only four can use MOX fuel.
The operation of the Rokkasho plant will likely be significantly curtailed even if it is completed amid that environment.
(This article was written by Yusuke Ogawa, Rintaro Sakurai and Shinichi Sekine.)

June 27, 2018

End reprocessing!

Make US-Japanese nuclear cooperation stable again: End reprocessing

https://thebulletin.org/2018/06/make-us-japanese-nuclear-cooperation-stable-again-end-reprocessing/

By Victor Gilinsky, Henry Sokolski,

In a little-noticed but remarkable statement last week, Japanese Foreign Minister Taro Kono described a key pillar of the Japanese-American alliance—US-Japanese peaceful nuclear cooperation—as "unstable." His pronouncement comes on the eve of the automatic renewal of the 1988 US-Japan peaceful nuclear cooperation agreement in July and days after US officials privately pressured Tokyo to reduce its vast plutonium holdings (some 45 tons —which translates to nearly 9,000 nuclear bombs' worth).

The starting point in dealing with this massive plutonium stockpile: Keep it from growing. **That means Tokyo needs to freeze plans to open its large Rokkasho reprocessing plant, which can separate eight more tons of plutonium a year.**

The United States and Japan got to this awkward spot in the 1970s and '80s, when Tokyo insisted it needed plutonium to fuel a future generation of fast breeder reactors and sought permission to extract it from irradiated US-supplied uranium fuel. We had earlier allowed the Euratom countries to do this and so President Reagan, hesitating to distinguish among close allies, relented. As Under Secretary of State Richard T. Kennedy told the Senate in 1982 in explaining blanket approvals for Japan and Euratom, "The US will not inhibit or set back civil reprocessing and breeder reactor development abroad in nations with advanced nuclear programs where it does not constitute a proliferation risk … nations which regard the uses of plutonium as crucial to meeting their future nuclear energy needs."

The 1988 understanding with Japan was the only US nuclear cooperation agreement with an individual country that granted blanket reprocessing approval for the duration of the agreement (which, with automatic extensions, effectively meant forever). The agreement approved reprocessing for Japan both in British and French reprocessing plants and in any that Japan itself might build. Meanwhile, Japan's fast breeder development faltered (as did other such breeder programs around the world), and Japan installed no commercial reactors of this type. Because it has a large fleet of nuclear power plants that produce spent nuclear fuel containing plutonium and reprocessing arrangements at home and abroad, Japan has amassed an enormous plutonium stockpile.

The legal basis of this blanket approval was problematic from the start. The General Accounting Office (GAO) told Congress that the agreement was so permissive it violated the strict nonproliferation requirements in Section 131 of the US Atomic Energy Act. For this reason, the Senate Foreign Relations Committee urged the Reagan administration to renegotiate the agreement, but the administration overrode Congressional opposition.

In Section 131 b 2, the Atomic Energy Act requires that reprocessing of nuclear reactor fuel supplied by the United States, and extraction of plutonium, take place only with US permission and sets forth the standard for granting reprocessing approvals: The secretaries of Energy and State must find that the action "will not result in a significant increase of the risk of proliferation." The "foremost consideration" in making that finding is whether the United States will have "timely warning," that is, "well in advance of the time at which the non-nuclear weapon state could transform the diverted material into a nuclear explosive device."

The GAO rejected the Reagan administration's claim that it was complying with the law by making a one-time finding that Japanese reprocessing would entail no "significant increase" in proliferation risk. The GAO said that "it cannot be asserted with any degree of confidence that over the succeeding 30-year period … the timely warning standard can be applied in a systematic and effective way to the blanket approvals at issue here."

The GAO was of course right. Japan has accumulated roughly 10,000 kilograms of plutonium at home and another 35,000 kg abroad over the course of the agreement. Can anyone claim with a straight face that this has not increased proliferation risks both in East Asia and globally? Why otherwise would US officials have asked Tokyo to reduce its plutonium holdings?

The plain fact is that the timely warning standard cannot be met in dealing with separated plutonium because, as the International Atomic Energy Agency acknowledges in its safeguards documents, the material can be fashioned into a nuclear weapon in a matter of days (in contrast with the low enrichment fuel used in common power reactors, which is far from weapons grade). It is impossible to devise any system that can provide warning in time for an effective international response. A country with a scientific and technological base, if it had secretly done preparatory work, could probably arm nuclear weapons in a matter of weeks after accessing its store of plutonium.

The official justification for allowing nuclear power systems based on plutonium—a fuel that is also a nuclear explosive—argued that they would be subject to IAEA inspections, which are intended to deter diversion of fissile material to military use by providing warning in time to thwart any such diversion. But the IAEA couldn't do that in the case of separated plutonium, so something had to give. What buckled was the definition of timely warning, which was rationalized to be met if we had sufficient confidence that the recipient of our exports would not build nuclear weapons. Hence, Under Secretary of State Kennedy could speak in 1982 of countries like Japan where nuclear explosive materials do "not constitute a proliferation risk."

The situation today, though, is radically different. The economic prospects of civilian nuclear power are now generally far less favorable than they were then; the rationale for plutonium-fueled breeder reactors, once widely believed to be the energy source of the future, has essentially evaporated. There is no longer any reason to twist the plain meaning of the Atomic Energy Act's requirement for timely warning. It effectively rules out approvals for plutonium separation, and therefore for reprocessing. Whereas one could have once plausibly argued that this would impose a severe cost on Japan, the situation is now completely reversed: If Japan shut down its Rokkasho reprocessing plant, it would now be freed from an outdated policy and would save a great deal of money.

The Rokkasho decision is of course up to Japan. But the United States should make clear where it stands, which it has not yet done. Such a step should be part of an overall US approach to end plutonium separation throughout the world, for which current nuclear power programs have no need. Nonproliferation and economics point in the same direction: no reprocessing provisions in future 123 agreements and urging other countries that sell nuclear material and technology to include such provisions in their agreements. The recent Korean summits emphasizing denuclearization and Secretary Pompeo's recent stand against reprocessing in the United Arab Emirates, Saudi Arabia, and Iran are steps in the right direction. They underline the importance of Japan ending its reprocessing.

July 5, 2018

Reducing Japan's plutonium stockpile

Japan nuclear agency urges measures to cut plutonium stocks

http://www.asahi.com/ajw/articles/AJ201807050064.html

THE ASSOCIATED PRESS

Japan's nuclear policy-setting body on Thursday endorsed a call for stricter management of its fuel recycling program to reduce its plutonium stockpile.

The annual "nuclear white paper" approved by the Atomic Energy Commission is a response to intensifying pressure from Washington as it pursues denuclearization in North Korea. It says Japan's fuel recycling program should minimize the amount of plutonium extracted from spent fuel for reuse in power generation to eventually reduce the stockpile.

Japan has pledged transparency and pledged not to possess plutonium that does not have a planned use, but the promise increasingly sounds empty because of the slow restarts of Japanese reactors that burn plutonium amid setbacks from the 2011 Fukushima disaster.
Though Japanese officials deny any possible misuse of the material and reprocessing technology, the large stockpile of plutonium that can make atomic bombs also raises security concerns as the U.S. wants North Korea to get rid of its nuclear weapons.
Commission chairman Yoshiaki Oka said Japan's effort to tackle its plutonium stockpile underscores its commitment to a peaceful nuclear program and takes into consideration the importance of maintaining "relationship of trust with the U.S."
The commission is compiling guidelines to better manage and reduce the plutonium stockpile. Measures would include some government oversight in setting a cap on plutonium reprocessing and a study into how to steadily reduce the plutonium processed abroad.
Japan has nearly 47 tons of plutonium--10 tons at home and the rest in France and Britain, where spent fuel from Japanese nuclear plants has been reprocessed because Japan is not able to reprocess it into plutonium-based MOX fuel at home.
The total amount is enough to make 6,000 atomic bombs, though officials at Japan's Rokkasho reprocessing plant denies any risk of proliferation, saying all plutonium is stored safely and closely monitored by the International Atomic Energy Agency.
After years of delay due to technical issues, the Rokkasho plant is in the final stages of safety approvals by the regulators ahead of its planned launch in 2021, but critics say that starting up the plant only adds to the problem.
The report says burning plutonium in 16-18 conventional reactors is "the only realistic method" in Japan to effectively consume plutonium. Only about 1 ton of plutonium was burned last year.

July 18, 2018

Reusing nuclear fuel

Japan OKs reuse of nuclear fuel from scrapped reactors for 1st time

https://mainichi.jp/english/articles/20180718/p2g/00m/0dm/075000c

The No. 1 and No. 2 reactors (from right to left) at Kansai Electric Power Co. (KEPCO)'s Oi Nuclear Power Plant in Oi, Fukui Prefecture, are seen from a Mainichi Shimbun helicopter. (Mainichi)
TOKYO (Kyodo) -- Japan's nuclear watchdog on Wednesday granted its first approval for a plan to reuse nuclear fuel taken out of decommissioned reactors in operational ones.

- 【Related】Nuclear watchdog OKs restart of aging nuclear plant hit by tsunami
- 【Related】TEPCO willing to resume Higashidori nuclear plant construction
- 【Related】Court rejects suspension of Oi nuclear power plant

The decision will allow Kansai Electric Power Co., the operator of the Oi nuclear power plant in central Japan, to load some nuclear fuel assemblies from its scrapped No. 1 and No. 2 reactors into its No. 3 and No. 4 reactors that resumed operation this spring.
A nuclear fuel assembly consists of fuel rods and those at the Oi plant in Fukui Prefecture are the same in size and interchangeable.
Fuel at a nuclear power plant is normally considered spent after three to five years of loading. Kansai Electric has stored some fuel assemblies from the No. 1 and No. 2 reactors that are still usable.

Of the 629 nuclear fuel assemblies from the two old reactors that the power company has decided to scrap, 264 are still usable. The remaining 365 units are expected to be sent to the Rokkasho plant in northeastern Japan for reprocessing.
A total of 216 new nuclear fuel assemblies prepared for the No. 1 and No. 2 reactors will also be used in the other two reactors at the Oi plant, according to Kansai Electric.
The Nuclear Regulation Authority will give its formal approval after hearing opinions from the Japan Atomic Energy Commission and other parties concerned.
In March, Kansai Electric notified the government of its plan to decommission Oi's aging No. 1 and No. 2 reactors. With a capacity of 1,175 megawatts each, the reactors would have been in operation for 40 years in 2019.
Since the 2011 Fukushima accident, most of the country's nuclear reactors remain offline.
Opposition to restarts remains strong in Japan despite the administration of Prime Minister Shinzo Abe maintaining its pro-nuclear policy.

Nuclear Japan-US pact on reprocessing extended

Japan To Continue Fuel Cycle Policy As Nuclear Pact With US Is Extended

https://www.nucnet.org/all-the-news/2018/07/18/japan-to-continue-fuel-cycle-policy-as-nuclear-pact-with-us-is-extended

A nuclear pact between Japan and the US has been automatically extended, allowing Tokyo to continue to reprocess spent nuclear fuel, extract plutonium and enrich uranium.
The bilateral Japan-US pact, which came into force in July 1988, puts Japan in the position of being the only country without nuclear arms that is allowed to reprocess spent nuclear fuel, press reports said.

Japan has long limited its nuclear research, development and energy uses to peaceful purposes.

However, there are reports that the US is increasingly concerned about Japan’s growing reserve of plutonium, a material which can be used to create nuclear weapons.

An energy policy plan approved by Japan earlier this month re-endorses using the nuclear fuel cycle, in which plutonium extracted from spent nuclear fuel at nuclear plants is used to generate power.

But the plan, noting calls from the US, said that Japan will make efforts to cut its stockpile of plutonium, which can be used in making nuclear weapons.

According to the Japan Atomic Industrial Forum (Jaif), Japan holds about 47 tonnes of plutonium. Of that 47 tons, around 10 tonnes were stored within Japan and the remainder in the UK and France as of the end of 2016, according to government data.

Spent nuclear fuel containing plutonium from nuclear power plants in Japan is sent to the UK and France for reprocessing and eventual fabrication into uranium-plutonium mixed oxide (MOX) fuel before being returned to Japan.

Most nuclear power plants in Japan remain offline following the 2011 Fukushima-Daiichi nuclear accident and need to pass revised safety regulations before they can be restarted.

The administration of prime minister Shinzo Abe has maintained its pro-nuclear policy, saying that plants able to clear the new stricter safety checks will resume operations.

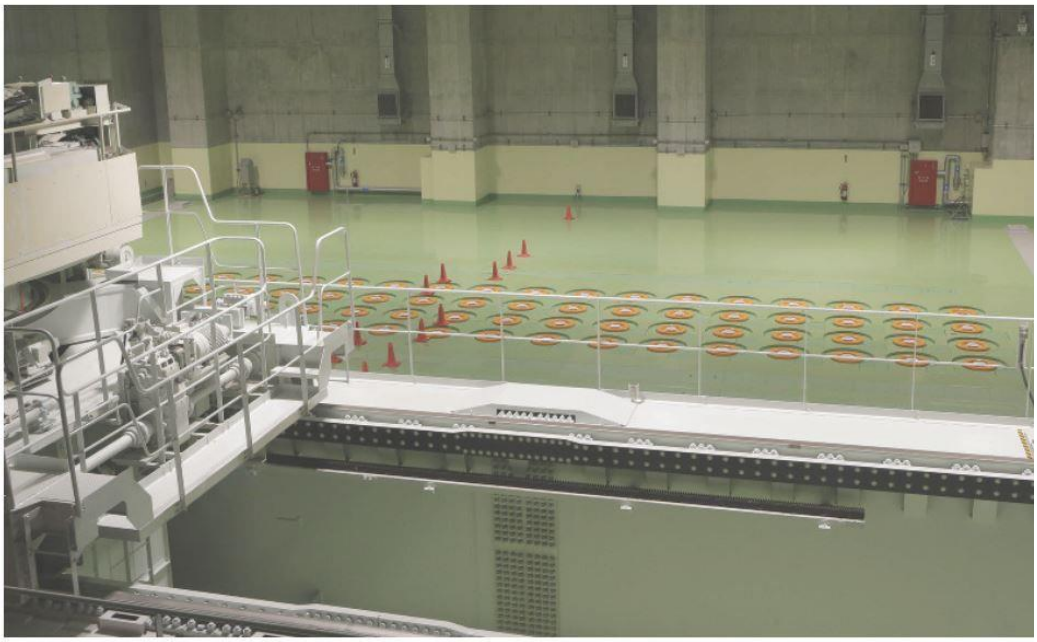
The energy plan calls for a nuclear share of around 20-22% by 2030. Jaif has said about 30 reactors must be brought back online to meet the target.

Nuclear regulators are also still assessing the safety of a planned spent nuclear fuel reprocessing plant in northeastern Japan after delays to its commissioning.

When fully operational the Rokkasho plant, a key pillar of the country's nuclear fuel recycling policy, will be able to produce around eight tonnes of plutonium a year, the Japan Times reported.

July 31, 2018

How Japan wants to reduce its plutonium stockpile



This Nov. 8, 2012 photo shows a floor crane, foreground, and storage pits at the vitrified high-level radioactive waste storage center, a part of the Rokkasho spent nuclear fuel reprocessing plant facilities, run by Japan Nuclear Fuel Ltd. in Rokasho village in Aomori Prefecture, northern Japan. (AP Photo/Koji Sasahara)

Japan nuclear regulator revises guidelines in bid to reduce plutonium stockpiles

https://mainichi.jp/english/articles/20180731/p2a/00m/0na/012000c

TOKYO -- The Japan Atomic Energy Commission (JAEC) has revised its guidelines for the use of plutonium for the first time in 15 years to clearly state that it will endeavor to reduce the country's stockpiles of the material that can be used to produce nuclear arms.

- 【Related】Japan, US extend nuclear pact amid concern about plutonium stockpile
- 【Related】Japan nuclear agency urges measures to cut plutonium stocks

- 【Related】Japan eyes more renewable energy use, plans to cut plutonium pile
- 【Related】Japan approves 70-year plan to scrap nuclear reprocessing plant

As part of these efforts, a nuclear fuel reprocessing plant in the Aomori Prefecture village of Rokkasho, currently under construction, will be mandated to extract only the necessary amount of plutonium from spent nuclear fuel that can be consumed at nuclear power plants.
The amended guidelines require electric power companies to join hands in consuming plutonium at Japanese nuclear plants that can use the substance as fuel in an effort to steadily decrease the country's stockpiles.
The revisions are aimed at dispelling concerns among the international community, including the United States, about Japan's possession of a massive amount of plutonium from the viewpoint of nuclear non-proliferation.
The commission's role is to present the long-term direction of Japan's nuclear power policy, and it will inform other countries of its stance through the International Atomic Energy Agency headquartered in Vienna. Plutonium stockpile reduction was incorporated in the New Strategic Energy Plan approved by the Cabinet of Prime Minister Shinzo Abe on July 3.
Plutonium is produced by reprocessing nuclear fuel used at atomic power stations. Japan currently possesses approximately 47.3 metric tons of the material, enough to produce approximately 6,000 nuclear weapons. Power companies that operate nuclear plants and other entities store plutonium in Japan and overseas.
The previous guidelines that were set in 2003 stipulated that Japan must not possess plutonium without the purpose of using the material. The recently revised guidelines mentioned reducing Japan's plutonium stockpile for the first time, but did not set numerical goals or a timeframe. It just stated that the maximum amount allowed "will not exceed the current level."
To achieve that objective, the guidelines limit the amount of plutonium that can be extracted from spent nuclear fuel at the Rokkasho reprocessing plant, which the government plans to put into operation in fiscal 2021, to a sufficient amount to produce mixed oxide (MOX) fuel, usually consisting of plutonium blended with natural uranium, to be burned at nuclear plants.
With regard to about 36.7 metric tons of Japanese plutonium being stored in Britain and France, the guidelines also urge utilities to cooperate closely in steadily reducing the amount.
The government wants the companies to use the substance as fuel at nuclear power plants that can use MOX fuel to achieve overall stockpile reductions. The utilities are required to publicize their plutonium usage plans every year.
Japan has been promoting the nuclear fuel cycle project, in which spent nuclear fuel is reprocessed and used as fuel at atomic power stations. For now, the government plans to process used fuel at nuclear plants into MOX fuel, and use such fuel at nuclear plants.
However, the consumption of such fuel has not progressed because only four nuclear reactors that can use MOX fuel for power generation are in operation after the March 2011 outbreak of the Fukushima nuclear crisis.
Once the reprocessing plant in Aomori Prefecture is put into full operation, the amount of plutonium will increase by up to about 8 tons a year. It is estimated that plutonium needs to be used at 16 to 18 nuclear reactors to consume the full amount. Under the current circumstances, operations at the reprocessing plant are bound to be strictly limited.
(Japanese original by Ei Okada, Tokyo Science and Environment News Department)

Japan to reduce plutonium stockpile

https://www3.nhk.or.jp/nhkworld/en/news/20180731_28/

Japan's government commission on nuclear energy has decided to reduce the country's stockpile of plutonium.

Japan has been promoting a program to recycle plutonium extracted from spent nuclear fuel.

In principle it does not possess plutonium whose purpose is unclear, because the material can be used for nuclear weapons.

But the unused stockpile keeps growing. Japan now has 47 tons of plutonium at home and abroad. If the fuel reprocessing plant at Rokkasho Village in the northern prefecture of Aomori is completed as scheduled in 2021, it will produce up to 7 tons of plutonium annually. This has heightened international concern.

The Atomic Energy Commission on Tuesday revised its guidelines on plutonium use for the first time in 15 years, stipulating that the stockpile will be reduced.

Japan currently uses plutonium for mixed oxide fuel for nuclear power plants. Under the revised guidelines, reprocessing plants are obliged to produce only the amount necessary, and what's produced must be used up. Power companies will be asked to cooperate in using and reducing plutonium.

Plutonium used for research and development, as in the Monju fast-breeder reactor, could be disposed of if there's no plan for what to do with it.

Commission chief Yoshiaki Oka said Japan must avoid being seen as stockpiling plutonium, amid global efforts toward nuclear nonproliferation. He stressed the need to specify how plutonium is used.

August 1, 2018

Continuing with reprocessing?

Editorial: Plutonium reduction does not fit in with nuclear fuel cycle

https://mainichi.jp/english/articles/20180801/p2a/00m/0na/005000c#cxrecs_s

The Japan Atomic Energy Commission (JAEC) has clearly stated for the first time that Japan will try to reduce its plutonium stockpiles. The new policy, incorporated in the commission's revised guidelines, is a reflection of Japan's principle of not holding plutonium without specific purpose of use -- a stance maintained from its standpoint of nuclear nonproliferation.

- 【Related】Japan nuclear regulator revises guidelines in bid to reduce plutonium stockpiles
- 【Related】Japan, US extend nuclear pact amid concern about plutonium stockpile
- 【Related】Editorial: Turn renewal of Japan-US nuclear pact into chance to reconsider reprocessing

Reasserting Japan's position at this juncture is important, as awareness about nuclear security is on the rise and the Japan-U.S. agreement on nuclear cooperation has been extended automatically. However, the first revisions since 2003 are half-baked and do not show a path toward a real reduction. Such measures will not be able to win international trust.

Plutonium is a product of the nuclear fuel cycle. The cycle was conceived out of concerns about uranium depletion, but now there is uranium aplenty. Moreover, fast-breeder reactors, which stood at the core of the cycle, have been found to be difficult to put into actual use and are not viable economically. The United States, Britain, Germany and others have already given up on such projects.
Japan, however has stuck with its nuclear fuel cycle, and to maintain it, the government lets power utilities use plutonium in mixed oxide (MOX) fuel as a stop-gap measure. But this arrangement has faced turbulence in the wake of the 2011 Fukushima nuclear disaster. As a result, the country has been left with stockpiles of about 47 metric tons of plutonium in Japan and overseas.
If a reprocessing plant for spent nuclear fuel that Japan is building in the northern prefecture of Aomori starts operation as planned, its domestic plutonium stockpile is bound to increase. Plutonium can be used to produce nuclear weapons, and it is understandable that Japan's neighbors and the United States have voiced concerns about increases in the amount of the material.
The revised guidelines state that operations at the reprocessing plant will be limited to the level needed to produce enough plutonium for MOX consumption. They also encourage power companies to cooperate in the reduction of overseas stockpiles.
However, the guidelines do not state that reduction is more important than reprocessing, and operation of the reprocessing plant has gone unquestioned. This arrangement is not going to reduce stockpiles.
For a real reduction of plutonium stockpiles, the government should take drastic measures such as freezing operation of the reprocessing plant or discarding plutonium in deep, secure underground locations. Handing over Japan's overseas stockpiles to countries now storing them is an option that merits discussion.
Japan must review the meaning of continuing with reprocessing and its nuclear fuel cycle.
The argument of seeking greater MOX consumption to reduce plutonium stockpiles is preposterous. Plutonium-based fuels are more expensive than uranium fuel. They also create concerns about nuclear proliferation. How to deal with the spent fuel is a tough question to answer, too.
Japan should not delay its departure from the nuclear fuel cycle any longer.

Japan's efforts to reduce PU stockpiles are not very convincing

Japan's efforts to decrease plutonium stockpiles do little to appease US, int'l community

https://mainichi.jp/english/articles/20180801/p2a/00m/0na/020000c

TOKYO -- Japan's efforts to decrease its stockpiles of plutonium -- material that can be used to produce nuclear weapons -- have failed to appease the international community, particularly the United States.

- 【Related】Japan nuclear regulator revises guidelines in bid to reduce plutonium stockpiles
- 【Related】Japan, US extend nuclear pact amid concern about plutonium stockpile
- 【Related】Japan nuclear agency urges measures to cut plutonium stocks
- 【Related】Japan eyes more renewable energy use, plans to cut plutonium pile
- 【Related】Japan approves 70-year plan to scrap nuclear reprocessing plant

Thomas Countryman, who served as assistant secretary of state for international security and nonproliferation in the U.S. administration of former President Barack Obama, has urged Japan to clarify how it will reduce its stockpiles of plutonium.

During a symposium in Tokyo in June, Countryman emphasized the United States has urged Japan to explain its reduction methods, adding that the current government of President Donald Trump is continuing to press Tokyo for such explanations.
In 1993, when Japan began to disclose the amount of plutonium it possessed, the volume stood at 10.8 metric tons. However, the figure increased more than four-fold to 47.3 tons by the end of 2017. The amount is feared to further increase in the future as Japan is approaching the completion of a spent nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture, slated for 2021.
Tokyo has explained that the country possesses plutonium mainly to be used as fuel at nuclear plants. Addressing the situation, Yoshiaki Oka, chairman of the government's Japan Atomic Energy Commission (JAEC), summoned executives of the Federation of Electric Power Companies of Japan (FEPC) in charge of nuclear power in March and conveyed the government's concerns about the international community's reaction to an increase in the amount of plutonium that Japan stockpiles.
"We are facing a serious problem internationally. We're under pressure from the United States to provide a convincing explanation," Oka told FEPC executives.
Japan's wariness over the U.S. reaction to Tokyo's growing stockpiles stems from the automatic extension of a bilateral nuclear agreement that has served as the basis for Tokyo's push for a nuclear fuel cycle policy, in which spent nuclear fuel is reprocessed and reused at such power stations.
Since India's first nuclear test in the 1970s, the international community has been wary of nuclear substances and atomic energy-related technologies. Japan, which lacks resources, has refused to compromise on the reprocessing of spent nuclear fuel to sustain its nuclear fuel cycle project.
The United States agreed that Japan would continue reprocessing spent fuel under the bilateral nuclear agreement that went into force in 1988. Tokyo is the only non-nuclear weapons power allowed to reprocess spent fuel under an agreement with Washington as an exception.
The agreement was automatically extended on July 17 this year, 30 years after it came into force. However, the renewed accord can now be scrapped if either Japan or the United States declares an end to the pact six months prior.
Since the agreement has become legally fragile, Japan has had no choice but to respect the U.S. position of demanding that Japan decrease its stockpiles of plutonium. The United States also fears that other non-nuclear powers could demand exceptional treatment like that given to Japan.
In response to such concerns, the Diet in 2016 enacted the Spent Nuclear Fuel Reprocessing Fund Act to increase the national government's involvement in spent nuclear fuel processing. Noting that plans to operate reprocessing plants must be approved by the economy, trade and industry minister under the legislation, officials explain that the national government can supervise such projects to prevent the country's stockpiles of plutonium from increasing.
The government attempted to use this framework to convince the international community, but was unsuccessful, a senior official of the Cabinet Office said. "The law doesn't explicitly state that the stockpiles will be slashed. Relevant provisions are vague. The law failed to convince Washington. Therefore, we implemented additional measures," said the official.
The deadlock in Japan's nuclear fuel cycle policy has been part of the problem. In 2016, the government decided to decommission the prototype fast-breeder nuclear reactor Monju in Fukui Prefecture -- the core of the fuel cycle -- because it had hardly been in operation due to a string of technical issues and accidents.
For now, the government plans to process used fuel into mixed oxide (MOX) fuel -- usually consisting of plutonium blended with natural uranium -- and use such fuel at nuclear plants.
Such power generation began in 2009, but only four nuclear reactors that can use MOX fuel have so far been put into operation because safety standards have been stiffened following the outbreak of the Fukushima nuclear disaster in March 2011.
The international community, especially the United States, has expressed growing concerns that Japan's stockpiles of plutonium could further increase following the start of operations at the Rokkasho reprocessing plant. A safety inspection by the Nuclear Regulation Authority on the plant has entered a final phase. The current stockpiles have remained high because the material has not been steadily consumed in Japan.

(Japanese original by Ei Okada, Science & Environment News Department)

August 30, 2018

Decommissioning starts at Monju

Work starts to decommission problem-plagued Monju reactor

http://www.asahi.com/ajw/articles/AJ201808300045.html

The Japan Atomic Energy Agency (JAEA) on Aug. 30 started work to decommission the Monju prototype fast-breeder reactor in Fukui Prefecture, a once-promising project that struggled with problems, even in preparations for its dismantlement.

The work started a month later than scheduled because of a series of equipment trouble. The JAEA workers also face an enormous challenge because Japan has no experience in decommissioning a fast-breeder reactor.

The JAEA will use overseas experiences as a reference for the delicate process.

Before the start of the work, JAEA President Toshio Kodama told staff members in a speech at the plant in Tsuruga, "I want you to tackle this work by bracing yourselves."

Monju had been a key facility in the government's nuclear fuel recycling program.

Construction of the reactor started in 1985, but a series of accidents, including a sodium coolant leak in 1995, as well as cover-ups kept the reactor offline for most of its life.

In 2016, after 1 trillion yen ($9 billion) had been spent on the project, the government finally decided to abolish Monju.

The decommissioning work is scheduled to take 30 years and cost 375 billion yen.

One of the riskiest parts in the decommissioning process is handling the liquid sodium, which reacts strongly with water and air.

In the first of the four-stage decommissioning project, the JAEA will transfer 530 nuclear fuel assemblies, currently kept in the liquid sodium-filled nuclear reactor and storage tank, to a water-filled pool by fiscal 2022.

In the work that began on Aug. 30, the JAEA will remove 160 nuclear fuel assemblies from the storage tank, wash away the sodium, and place them in the pool.

From 2019, the agency will transfer nuclear fuel assemblies from the reactor to the storage tank and then to the pool.

In December this year, the JAEA will also start to transfer about 760 tons of sodium, which has not been exposed to radioactive substances, to its storage tank. Later, the agency will remove about 910 tons of radioactive sodium from the reactor and other equipment.

In the following stages, the agency will dismantle the nuclear reactor, the turbine and other facilities.

However, no decision has been made on how to dispose of the nuclear fuel removed from the reactor and the storage tank. Monju has used mixed oxide (MOX) fuel, which contains plutonium and currently cannot be reprocessed in Japan.

"It's realistic to ask an overseas company to reprocess it," said Toyoshi Fuketa, chairman of the Nuclear Regulation Authority, the government's nuclear watchdog.

If reprocessing expenses in a foreign country are added, the overall decommissioning costs will sharply increase.

August 31, 2018

Safety vital in scrapping Monju

EDITORIAL: Safe and steady progress needed to finally end Monju debacle

http://www.asahi.com/ajw/articles/AJ201808310018.html

The Japan Atomic Energy Agency (JAEA) on Aug. 30 started work to remove nuclear fuel from the Monju prototype fast-breeder reactor in the first stage of decommissioning the trouble-prone experimental reactor in Tsuruga, Fukui Prefecture.

It is the first step in a long and grueling process that will take three decades. Safe and steady progress is vital for achieving the goal.

Monju burns uranium-plutonium mixed oxide (MOX) fuel and is cooled by liquid sodium, instead of water.

Monju worked only very briefly during the more than 20 years of its life, and the government decided to pull the plug on the reactor at the end of 2016.

While the work to remove fuel continues, the liquid sodium coolant will be extracted from Monju, and related equipment will be dismantled. The reactor building will then be demolished and removed.

There have only been 10 or so cases of decommissioning a fast reactor in the world. These rare projects have been carried out in such countries as the United States, Britain and France. Maximum caution is in order to ensure safety in the process.

Plutonium is a material used to make atomic bombs. To avoid causing unnecessary concerns about nuclear proliferation, the operator should adequately share information about fuel transfer work with the International Atomic Energy Agency (IAEA).

According to the JAEA's plan, 530 fuel assemblies will be removed from the reactor core and the storage tank outside the reactor, which are filled with sodium coolant. The fuel assemblies will be cleaned before being transferred to an on-site water-filled storage pool. This stage is scheduled to be completed by fiscal 2022.

Since sodium is not transparent, it is impossible to see the fuel assemblies submerged in liquid sodium while retrieving them.

Only two fuel assemblies have ever been transferred to the pool at the Monju plant. There are only about 10 workers who have experienced the task.

During a test operation eight years ago, refueling equipment fell into the reactor vessel. Work to remove fuel was originally scheduled to begin in late July, but the start has been delayed by one month due to a series of troubles with related equipment.

A rigorous system of checks and double-checks is indispensable for ensuring steady progress in the project.

Removing fuel is not the only part of the process that requires great care and caution. Sodium reacts violently with water or air. A sodium leak accident at Monju in 1995 caused a fire. Radioactive sodium requires particularly cautious handling.

The JAEA is known for its problem-plagued history. It has been criticized for poor safety consciousness and lax discipline.

While scrapping Monju, the JAEA will also decommission its facility to extract unused fissionable material, plutonium to be exact, from spent nuclear fuel in Tokai, Ibaraki Prefecture, in a 70-year-long process.

That means the JAEA will have to maintain high levels of alertness, attentiveness and discipline for a very long period of time.

Some 1.1 trillion yen ($10 trillion) has already been spent on the Monju project, and decommissioning the reactor will cost at least 375 billion yen. Most of the money has been or will be paid by taxpayers.

No sharp increase in the cost of decommissioning due to glitches or human errors is acceptable.
It should not be forgotten that the process also poses one common and sticky challenge involved in decommissioning any nuclear reactor.
No decision has been made on how to dispose of the nuclear fuel, sodium and other radioactive waste that will be produced in the decommissioning process.
Instead of postponing actions to tackle this challenge, the government should immediately embark on serious efforts to find a solution to this tough question.

September 3, 2018

What MOX program?

Japanese utilities ended funding for nuclear fuel reprocessing in 2016, putting MOX program in doubt

https://www.japantimes.co.jp/news/2018/09/03/national/japanese-utilities-ended-funding-nuclear-fuel-reprocessing-2016-putting-mox-plans-doubt/#.W45GDsLLipo

Kyodo
Utilities that operate nuclear power plants stopped funding the reprocessing of nuclear fuel in fiscal 2016, their financial reports showed Sunday, a step that may affect resource-scarce Japan's nuclear fuel recycling policy.
The 10 utilities, including Tokyo Electric Power Company Holdings Inc. and Japan Atomic Power Co., apparently halted allocating reserve funds for reprocessing costs due to the huge expenses linked to building the reprocessing facilities, sources said.
The government, along with the power companies, has been pushing for the reuse of mixed-oxide, or MOX, fuel, which is created from plutonium and uranium extracted from spent fuel.
While Japan has not changed its policy on spent fuel reprocessing, the outlook for it has remained uncertain since the 2011 Fukushima disaster. At the same time, the government's latest energy plan in July also stated for the first time that disposal of spent MOX fuel as waste can be considered.
If MOX fuel cannot be reprocessed, nuclear fuel can only be reused once.
For the reprocessing of spent MOX fuel, the utilities had allocated about ¥230 billion in reserves as of March 2016.
Currently, only two reactors at Kansai Electric Power Co.'s Takahama power plant, one reactor at Shikoku Electric Power Co.'s Ikata plant and one reactor at Kyushu Electric Power Co.'s Genkai power plant use MOX fuel in so-called pluthermal power generation.
As Japan has decided to cut its stockpile of plutonium, the government and utilities aim to increase plants for pluthermal generation. But if spent MOX fuel is not reprocessed, it would be considered nuclear waste, raising concerns over how to deal with it.
Japan Nuclear Fuel Ltd. — in which power companies have invested — has been pursuing the construction of a spent nuclear fuel reprocessing plant in northeastern Japan as well as a MOX fuel fabrication plant, with the costs coming to about ¥16 trillion.
But a series of problems has resulted in their delay. When operational, the Rokkasho plant in Aomori Prefecture, key to Japan's nuclear fuel cycle policy, can reprocess up to 800 tons of spent nuclear fuel per year, extracting about 8 tons of plutonium.
With this setback, if new MOX reprocessing plants are to be built, it would be hard to secure further funding.

November 29, 2018

Scrap ASTRID?

France reviews fast-breeder nuclear reactor project

https://www.reuters.com/article/us-france-nuclearpower-astrid/france-reviews-fast-breeder-nuclear-reactor-project-idUSKCN1NY27A

TOKYO/PARIS (Reuters) - France's state-run nuclear agency said on Thursday it had presented options on a new generation of fast-breeder nuclear reactors to the French government and talks were underway but dismissed reports in Japan that it had taken a decision.

The Nikkei business daily reported that France had informed Japan it would halt research into the ASTRID (Advanced Sodium Technological Reactor for Industrial Demonstration) project in 2019, with no plans to allocate a budget from 2020.

A spokesman for the CEA nuclear agency said one option it had discussed was to reduce ASTRID's capacity to a 100-200 megawatt (MW) research model from the commercial-sized 600 MW originally planned.

Japan's Chief Cabinet Secretary Yoshihide Suga said on Thursday he had not been informed about any French plans to freeze the project and that nothing has been decided.

In 2016, after decades of development, Japan pulled the plug on its own $8.5 billion Monju prototype fast-breeder project.

The ASTRID sodium-cooled reactor is one of several new "fourth-generation" designs that could succeed the pressurized water reactors that drive most of the world's nuclear plants. tinyurl.com/y84d2hvc

Instead of water, they use liquid sodium as a coolant. But sodium burns on contact with air and explodes when plunged into water. An earlier French model was scrapped in the 1980s after have encountering major technical problems.

Russia is the only nation to have working breeder reactors, which can burn spent uranium fuel, plutonium and other nuclear waste products.

In theory, breeders could turn utility EDF's nuclear waste into fuel and make France self-sufficient in energy for decades. Their potential is part of the reason why France recycles spent fuel from EDF's reactors, separating out plutonium in state-owned Orano's reprocessing plant in La Hague.

"The likely abandoning of ASTRID should entail the rethink of the entire spent-fuel management scheme," World Nuclear Industry Status Report author Mycle Schneider.

In 2010, the ASTRID project was granted a 652 million euro ($742 million) budget. Media reports have estimated France has budgeted up to 900 million euros through to 2019 for ASTRID.

President Emmanuel Macron said this week that nuclear will remain a key part of France's power supply and that research in the field must be continued, but he did not mention ASTRID.

Reporting by Kaori Kaneko and Osamu Tsukimori in Tokyo and Geert De Clercq in Paris; Editing by Sherry Jacob-Phillips and David Evans

November 30, 2018

France's intention to drop ASTRID project blow to Japan

France halts joint nuclear project in blow to Japan's fuel cycle

https://asia.nikkei.com/Economy/France-halts-joint-nuclear-project-in-blow-to-Japan-s-fuel-cycle

Move comes as tensions mount over Renault-Nissan

TAKASHI TSUJI, Nikkei staff writer

TOKYO -- The French government has informed Japan it will halt joint development of advanced nuclear reactors, Nikkei has learned, dealing a blow to the fuel cycle policy underpinning much of the East Asian country's energy plans.

France is expected to halt research from next year into the Advanced Sodium Technological Reactor for Industrial Demonstration project, or Astrid, and stop setting budgets for the fast breeder reactors from 2020.

French President Emmanuel Macron revealed plans Tuesday to cut France's nuclear reliance to 50% from the current 70%. Under that plan, the Astrid project, which has faced ballooning construction costs and cutbacks, appears to have been viewed as less urgently needed.

The French government denied it has made an official decision on the matter, according to Reuters. But the consideration comes at a time when tensions between Tokyo and Paris are mounting over the arrest of former Nissan Chairman Carlos Ghosn, and Renault's control over the Japanese automaker.

Japan viewed Astrid as a keystone of its plans to recycle spent nuclear fuel. The country pulled the plug in 2016 on its own prototype fast breeder reactor. That reactor, known as Monju, encountered a great deal of trouble and incurred heavy costs over its decades-long history.

Nuclear reactors generate power by using nuclear fission reactions to vaporize water and create steam that rotates turbines. Fast breeder reactors can run on so-called mixed-oxide fuel made with plutonium gathered from reprocessing spent nuclear fuel, and are more efficient than light-water reactors, a common variety.

Japan's government is hurrying to ascertain the details of France's revised nuclear plan. In the meantime, it appears to be against giving up on the fuel cycle policy. It is widely expected to keep

research alive through government-linked organizations and continue exploring possibilities of realizing fast breeder technology even decades down the road.

Even so, the loss of Astrid is significant. Just a few of Japan's nuclear reactors currently use mixed-oxide fuel, and the country's plutonium stores continue to pile up far faster than it can be consumed -- driving the U.S. to express concern, as the fissile material can be used in nuclear weapons.

The blow to the fuel cycle policy may trigger calls from Japan's government and from opposition parties to revise national energy policy.

December 5, 2018

Difficult for Japan to admit failure of Monju (and reprocessing)

EDITORIAL: With fast reactor plan, ministry refuses to admit failure of Monju

http://www.asahi.com/ajw/articles/AJ201812050021.html

Disregarding the failure of its hugely expensive Monju prototype fast-breeder reactor project, the Ministry of Economy, Trade and Industry on Dec. 3 announced an outline of a new fast reactor project that would require massive, continued investments.

The government must rethink this plan. It is simply wrong to try to keep alive its nuclear fuel recycling program whose uselessness has been proved by Monju.

A fast reactor enables efficient combustion of plutonium for power generation. It plays the crucial role in a nuclear fuel recycling program that reuses plutonium extracted from spent fuel. Japan has been developing the technology since the 1950s.

But the government in 2016 announced that Monju, which cost taxpayers 1.1 trillion yen ($9.73 billion), would be decommissioned after two decades of remaining a virtual white elephant.

Future plans have been discussed by a working group of the Council on Fast Reactor Development that was formed in 2016, consisting of government ministries and agencies concerned, utilities and nuclear power plant manufacturers.

The outline of the new project was the first put together by the council.

Before the 2011 Fukushima disaster, the government was planning to complete a post-Monju demonstration reactor by around 2025 and have a commercial reactor before 2050.

But according to the new outline, the post-Monju demonstration reactor will start operating around mid-century and a fast reactor will enter into full operation in the latter half of the century.

This avoidance to indicate any specific timetable effectively spells a postponement.
The outline also gives no specifics on the type or output of the new reactor, and yet says its technology will be defined in about five years from now.

Clearly, the government's aim is to simply keep the development going.
Abandoning the development of a new fast reactor would be tantamount to admitting the failure of the nation's nuclear fuel recycling policy.

Such an admission would lead to all sorts of problems, such as what to do about a fuel reprocessing plant currently under construction in Aomori Prefecture and how to deal with all the spent fuel piling up at nuclear power plants around the nation.

The only way to avoid opening this can of worms is to simply continue fast reactor development and gloss over the failed fuel recycling program, and that is exactly what the government is doing.

And that was precisely why the government made no attempt to fully assess the pros and cons of fast reactor development itself when it decided to scrap Monju.

To keep alive its failed nuclear fuel recycling program, the government is slapping a huge tab on taxpayers, in the forms of taxes and utility charges. If this isn't irresponsible, what is?

With costs rising from reinforced safety measures after the Fukushima disaster, even "ordinary" nuclear power generation is losing economic viability. There is no practical merit in commercializing a fast reactor that is technically much harder to develop and is a poorer choice in terms of profitability.

In fact, those reasons were cited by many advanced nations for giving up such projects. Even France, which has been determined to hang on, is now faced with snags in its Advanced Sodium Technological Reactor for Industrial Demonstration (ASTRID) fast reactor project.

We cannot understand the Japanese government's refusal to look at this reality objectively.

The nation must appropriate its limited budget effectively to areas that offer future potential, such as renewable energy.

December 18, 2018

Not giving up on fast reactors

Roadmap compiled for development of fast reactors

https://www3.nhk.or.jp/nhkworld/en/news/20181218_39/

Japan's new roadmap for the development of fast nuclear reactors targets the latter half of the 21st century for the start of commercial operation.

A government working group on Tuesday compiled the roadmap, which pushes back the launch target by about 100 years from the initial plan.

The development of fast nuclear reactors has been the pillar of Japan's nuclear fuel recycling policy.

The state's long-term plan in 1967 targeted the late 1980s for the start of the commercial operation of fast reactors. But the plan has been delayed for many years --- the prototype fast-breeder reactor Monju began operation in 1994. The following year, Monju had trouble with a coolant leak, and has

since then experienced a series of problems.

The government finally decided to scrap Monju in 2016, after spending over one trillion yen, or about 8.9 billion dollars on it.

The new roadmap shows a target period for starting the commercial operation of fast reactors for the first time since the 2011 Fukushima nuclear accident.

Nagasaki University Professor Tatsujiro Suzuki, who is a former member of Japan's Atomic Energy Commission, says the delay in the target for starting operations indicates uncertainties over the environment surrounding nuclear energy in Japan.

Suzuki calls for discussions on long-term research and development that suit the current times, rather than merely pushing forward with the development of fast reactors.

Storage of Nuclear Waste

November 28, 2013

Base choice of storage site on "scientific information"

Govt. to pick potential sites for nuclear waste

http://www3.nhk.or.jp/nhkworld/english/news/20131128_15.html

A Japanese government panel has proposed a new way for the government to find potential disposal sites for nuclear waste. It says that the government should choose locations based on scientific information.

Until now, the government relied on applications from local administrations to offer sites for underground storage of highly radioactive nuclear waste.

It began looking for candidate sites 11 years ago, but no local governments have made any offers.

The new plan drawn up by the industry ministry panel says the government should choose suitable areas based on scientific information such as ground stability.

The experts also call for setting up a system in which the views of residents, and not just those of the local governments, are taken into consideration in deciding whether to build a nuclear waste storage in their area.

As a reason for the proposal, the panel says that it is difficult for local officials to explain their decision about offering a storage site to residents without providing a scientific explanation.

The panel also mentions concerns that residents will be sidelined if a local government offers a site for the purpose of receiving government subsidies.

The revised plan will be reported at an industry ministry's meeting on Thursday.

The ministry intends to reflect the proposal in an energy plan which will be compiled by the end of this year.

January 26, 2016

Below seabed disposal?

Japan studying disposal of highly radioactive waste under seabed

http://www.japantimes.co.jp/news/2016/01/26/national/japan-studying-disposal-highly-radioactive-waste-seabed/#.VqfBqVKDmos

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The Ministry of Economy, Trade and Industry has started work on identifying the technical challenges of constructing a disposal facility under the seabed for highly radioactive spent nuclear fuel.

A study group set up by the ministry is to finish the work by around summer.
The government would be able to skip potentially tough negotiations with landowners if it decides to build a disposal facility under the seabed.
But construction of such a facility would involve many hurdles.
At a meeting of the study group Tuesday, a ministry official stressed that nothing has been decided.
Such a facility would have to be connected to an onshore facility through a tunnel so as not to violate an international law that restricts dumping nuclear waste at sea.
Candidate sites are expected to be 10 to 15 km off the coast, an official from the Nuclear Waste Management Organization of Japan said at the meeting.
The ministry also plans to take into account nearby volcanos and active faults when it assesses candidate sites.

'Below seabed' nuclear waste disposal study begins

http://www3.nhk.or.jp/nhkworld/english/news/20160126_32.html

Japan's industry ministry has launched an expert team to study disposal of highly radioactive waste from nuclear power plants. The study includes as potential candidate sites areas beneath the coastal seabed.

A ministry panel last month compiled an interim report on conditions of disposal sites for such waste made of residual liquid from reprocessed spent fuel.

The report suggested areas within 20 kilometers of coasts as appropriate disposal sites, saying their proximity to ports makes them safe for nuclear waste transport.

The ministry set up the team to carry out a geological survey of coastal areas.

At its meeting on Tuesday, officials from the Nuclear Waste Management Organization showed a picture of how tunnels from coastal areas or a nearby island would connect disposal sites built under the seabed.

They said groundwater flows slowly beneath the seabed, and that such disposal sites are unaffected by sea level changes and have security advantages.

The team is to study technical issues such as geological features and seawater impact before compiling a report by around the middle of this year.

Toaki mayor OKs permanent disposal site

Tokai mayor accepts nuclear waste disposal plan

http://www3.nhk.or.jp/nhkworld/english/news/20160126_33.html

The mayor of the village hosting a closed nuclear plant near Tokyo has told NHK that he will approve a plan to bury some low-level radioactive waste at the facility.

In 2001, the operator, Japan Atomic Power Company, began the process of scrapping the Tokai plant in Ibaraki Prefecture. The first commercial nuclear plant in Japan had been closed in 1998.

In July last year, the operator revealed a plan to permanently dispose of more than 12,000 tons of low-level radioactive waste by burying it at the facility.

The waste includes concrete chunks and metal parts from demolished buildings, and is classified under the lowest of the 3 categories of nuclear waste.

Tokai Mayor Osamu Yamada said the decommissioning process should not be delayed because local authorities will not accept permanent disposal sites. He added that he feels the plan's approval is inevitable, as there is no other choice.

The burying of the waste will start after the plan passes the Nuclear Regulation Authority's screening, and obtains official approval from Ibaraki Prefecture and Tokai Village.

If the plan is implemented, Tokai Village would become the first municipality in Japan to host a permanent disposal site for contaminated waste.

Fukushima waste to remain dispersed in Ibaraki Pref.

Environment ministry to OK dispersed storage of radioactive waste within Ibaraki Pref.

http://mainichi.jp/english/articles/20160126/p2a/00m/0na/006000c

The Ministry of the Environment is set to allow radioactive waste emanating from the Fukushima No. 1 Nuclear Power Plant disaster to remain spread out among multiple storage locations in Ibaraki Prefecture rather than begin construction of a longer-term storage facility there, it has been learned.
The ministry plans to notify local officials as soon as next week. The plan until now has been to create a single waste disposal center for radioactive material in each of the prefectures of Miyagi, Tochigi, Gunma, Ibaraki and Chiba, but five years after the disaster the locations for these centers have yet to be decided. In allowing the dispersed storage in Ibaraki Prefecture, the ministry is adopting a more flexible approach in an attempt to move the situation forward.
The ministry will enter into talks with Gunma and Chiba prefectures, which also store most of their waste spread out among municipal facilities, on whether to continue the dispersed method of storage in those prefectures as well.
Under the earlier plan, the government had decided in November 2011 to create concrete-covered centralized waste deposal sites in the five prefectures. However, the selection of candidate sites -- Kurihama, Kami and Taiwa in Miyagi Prefecture, Shioya in Tochigi Prefecture and the city of Chiba -- has sparked protests from residents and municipal governments, hindering surveying work prior to construction.
In Ibaraki Prefecture, 14 municipalities are storing a combined amount of around 3,500 metric tons of radioactive waste. In late December last year, Ibaraki Gov. Masaru Hashimoto told the environment ministry that the shared opinion of the heads of the 14 municipalities was that they wanted to continue with this dispersed method of storage.
After receiving Hashimoto's message, Shinji Inoue, state minister of the environment, said, "The circumstances and desires of each prefecture are different. We will take their requests seriously and consider options including dispersed storage."
The waste consists of material giving off more than 8,000 becquerels of radiation per kilogram. In Ibaraki Prefecture, almost all of it is being kept at municipality-managed trash-incineration sites and at prefecture-managed sewage processing sites. The environment ministry says the waste is being "stored under comparatively stable conditions" in the prefecture.
Possibly in early February, the ministry will meet with Ibaraki Prefecture municipal heads to hear local opinions on matters such as reputational damage from storing radioactive waste, and will officially make its final decision on whether to allow the waste to continue being stored in a dispersed manner. The ministry says the possibility of gathering the waste into a centralized location in the future will remain.
In Miyagi and Tochigi prefectures, much of the radioactive waste consists of things like rice straw, and over 60 percent of it is kept in storage by residents. A senior environment ministry official says the waste is "in unstable circumstances, and it needs to be managed centrally in a robust facility." For these prefectures, the ministry is expected to keep to its plan of storing the waste in a single facility, but there are no prospects for when the location will be decided.
Fukushima Prefecture, which has the most radioactive waste from the disaster, will process its waste at an existing facility in the town of Tomioka as it accepted a national government plan in December last year. Waste with a level of radioactivity of 100,000 becquerels or more per kilogram is due to be stored at midterm storage facilities in the towns of Okuma and Futaba in the prefecture.

January 27, 2016

Dealing with Nuclear Waste

http://www3.nhk.or.jp/nhkworld/english/news/nuclearwatch/20160127.html

Daisuke Kamikubo
Decommissioning work is underway at 3 nuclear power plants across Japan. But there's a problem. There are no set rules for storing low-level waste. The mayor of Tokai Village in Ibaraki Prefecture says his community intends to be the first to allow such a disposal site.
"I do not want to see the demolition work suspended."
Osamu Yamada / Tokai Village Mayor
Tokai Village Mayor Osamu Yamada has thought long and hard about the Tokai Power Station. He wants to see its demolition completed, but there are hurdles to overcome.
The Tokai Power Station began operating in 1966. It was Japan's first commercial nuclear plant. Operations ended in 1998, and 3 years later, it became Japan's first commercial nuclear reactor to be decommissioned.
The challenge was figuring out how to dispose of its radioactive waste.
The central government takes care of high-level waste. But it has asked power utilities to deal with low-level waste.
There are 3 categories of low-level nuclear waste. L1, the highest, includes the inner parts of a reactor. L2 includes a reactor's containment vessel. L3, the lowest, includes concrete and other structural debris from demolished buildings.
The Japan Atomic Power Company operated the Tokai plant. Its plan is to permanently bury L3 waste at the plant site. But to do that, it needs local government approval.
"Now that the waste is limited to L3, I feel there is no alternative but to approve of the plan."
Osamu Yamada / Tokai Village Mayor
If this plan is finalized, Tokai Village will become the first municipality in the country to approve radioactive waste disposal.
But the problem of how to dispose of the plant's other low-level waste remains.
Tokyo Denki University Assistant Professor Kohta Juraku sits on a national council for radioactive waste.
"The question is, should the waste be disposed of on site or off site? Or should it be moved to other areas? These discussions ought to be led by the national government, and seek a consensus."
Kohta Juraku / Assistant Professor, Tokyo Denki University
Other facilities that are being decommissioned have no plan for the disposal of their radioactive waste. There is no word from any level of government on how to deal with the challenge.

January 30, 2016

Spent MOX fuel: Where to?

Restart of Takahama nuke plant refuels question about spent MOX fuel

http://mainichi.jp/english/articles/20160130/p2a/00m/0na/013000c

Japan has resumed its "pluthermal" power generation project using uranium-plutonium mixed oxide fuel (MOX fuel) for the first time in three years and 11 months, with the reactivation of the No. 3 reactor at the Takahama nuclear power plant in Fukui Prefecture on Jan. 29.
The spent MOX fuel to be generated at the plant, however, will have nowhere to go for reprocessing, just as conventional spent nuclear fuel -- leaving Japan with yet another nuclear waste problem.
"The reactor restart bears great significance in terms of promoting the nuclear fuel cycle," said Economy, Trade and Industry Minister Motoo Hayashi at a press conference on Jan. 29.

The government has promoted the nuclear fuel cycle as part of its national policy and has been seeking to breed plutonium while using it to fuel fast-breeder reactors.
However, the Monju prototype fast-breeder reactor in Fukui Prefecture has hardly been operational due to a sodium leak accident in 1995 and a spate of other problems, giving way to the pluthermal project that emerged as an alternative way out.
The prospect of successfully reprocessing spent nuclear fuel -- a precondition for the nuclear fuel cycle -- is nowhere in sight in Japan. Construction of the Japan Nuclear Fuel Ltd.'s spent fuel reprocessing plant in Rokkasho, Aomori Prefecture, is lagging behind schedule, and spent fuel has been accumulating on the premises of each nuclear plant across the country. At the Takahama complex, spent nuclear fuel has filled two-thirds of its capacity.
In October last year, the government drew up a plan to expand the country's capacity to hold spent nuclear fuel. Kansai Electric Power Co. unveiled a plan to start operating an interim storage facility for spent nuclear fuel outside of Fukui Prefecture sometime around 2030, but no specific steps are in sight.
While the destination of conventional spent nuclear fuel is already unclear, reprocessing of spent MOX fuel poses yet further challenges. Because spent MOX fuel is beyond the capacity of the Rokkasho plant, there needs to be built yet another plant dedicated to reprocessing spent MOX fuel. However, there's not even a blueprint for building such a plant.
"For the time being, we will properly keep (spent MOX fuel) within the grounds of the Takahama plant," said a Kansai Electric Power Co. official.
Hideyuki Ban, co-director of the Citizens' Nuclear Information Center, said, "It is unclear whether spent nuclear fuel will really be reused, while the final disposal site has yet to be decided. It is likely that spent fuel will continue to be kept at each nuclear plant. Power companies are now facing the high price for having prioritized reactor restarts and construction."

February 3, 2016

Decommissioning approved but what to do with the waste?

Nuclear operator gets approval for demolition plan

http://www3.nhk.or.jp/nhkworld/english/news/20160203_29.html

Japan's government has given approval for the operator of a nuclear plant in central Japan to decommission equipment around 2 of its reactors.

Chubu Electric Power Company got the approval for the 2nd phase of its decommissioning plan from the Nuclear Regulation Authority on Wednesday.

The firm started work on the reactors at the **Hamaoka plant** in Shizuoka Prefecture 7 years ago, with the aim of completely decommissioning them by fiscal 2036.

The operator plans to dismantle the equipment, such as turbines and pipes for radioactive steam, by fiscal 2022 and decontaminate pressure vessels.

It estimates that the phase will yield about 5,000 tons of low-level radioactive waste, but has no dependable plan for where to dispose of it. The utility plans to tentatively keep some of the waste in buildings at the plant.

The operator says it will work with other firms in the country's power industry and take into account government policy in finding disposal sites.

February 4, 2016

Reclassifying radioactive waste & multiple site storage

Government OKs multiple-site storage of radioactive waste

http://www.japantimes.co.jp/news/2016/02/04/national/government-oks-multiple-site-storage-radioactive-waste/#.VrOD3FKDmot

JIJI
MITO, IBARAKI PREF. – The Environment Ministry on Thursday allowed Ibaraki Prefecture to continue storing waste contaminated with radioactive substances from the March 2011 nuclear disaster in multiple locations within the eastern prefecture for the time being.
The ministry conveyed its tolerance of multiple-site storage at a meeting with officials from Ibaraki Prefecture and 14 municipalities in the prefecture that are currently storing such designated waste on a temporary basis.
This is the first time the ministry, which has upheld a policy to construct one designated waste disposal facility in each of the prefectures of Miyagi, Ibaraki, Tochigi, Gunma and Chiba, to give the green light to multiple-site storage within a prefecture.
Designated waste, including incineration ash, sewage sludge and paddy straw, is contaminated with radioactive substances exceeding 8,000 becquerels per kilogram as a result of the triple meltdown at Tokyo Electric Power Co.'s Fukushima No. 1 nuclear power plant caused by a major earthquake and tsunami.
Although the ministry has been pursuing the policy of concentrating such waste in one location in each of the five prefectures for disposal, the construction of disposal facilities has yet to transpire five years after the nuclear accident amid strong opposition from local residents.
The ministry's decision to tolerate multiple-site storage is apparently intended to overcome the situation.
The ministry plans to have the municipalities in Ibaraki Prefecture continue safely storing designated waste for now, and have them dispose of the waste after radiation levels fall below 8,000 becquerels per kilogram.
As a result, the ministry forecasts that the amount of designated waste will drop to about 0.6 ton in about 10 years from 3,643 tons at present.
It will examine whether multiple-site storage can be continued in Gunma and Chiba prefectures, where municipalities are storing designated waste indoors just like those in Ibaraki Prefecture.
At Thursday's meeting, the ministry proposed rules that would require the central and local governments to hold talks in advance if the radioactive waste designation is to be lifted.
The ministry also indicated a plan to consider providing financial support to municipalities that dispose of the waste after removal of the designation as radioactive waste at their existing facilities.

Some radioactive waste to be reclassified

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's Environment Ministry will allow some of the waste previously confirmed to have radioactivity levels above the government-set limit to be dumped in ordinary landfill sites.

The ministry cites the decline in radiation levels in such waste 5 years after the Fukushima Daiichi nuclear crisis.

The waste includes piles of rice straw and ash produced at garbage incinerators contaminated with radioactive materials exceeding 8,000 becquerels per kilogram due to fallout from the accident.

Under ministry rules introduced in the aftermath of the nuclear accident, such waste must be disposed of separately from ordinary, non-radioactive waste.

170,000 tons of such waste has been stored in 12 prefectures in eastern Japan, with nowhere to go because of local opposition to construction of disposal facilities.

The Environment Ministry says the radiation level of all that waste has fallen significantly over the last 5 years. Some now has a radioactivity level low enough to permit it to be dumped as regular waste.

The ministry explained its new policy on Thursday at a meeting with local officials in Ibaraki Prefecture. The prefecture, located south of Fukushima, has about 3,500 tons of the radioactive waste in storage.

Ministry officials explained that about 70 percent of that waste now has a radioactivity level below the threshold of 8,000 becquerels. They said it is deemed safe enough to be disposed of with regular waste.

The ministry estimates that 10 years from now, Ibaraki will only have about 0.6 tons of waste that still has radioactivity above the limit.

The ministry hopes to start the disposal project in Ibaraki, and will cover the expenses.

February 27, 2016

The issue of nuclear waste can't be ignored forever

EDITORIAL: Dealing with nuclear waste a pressing concern with Takahama reactor restart

http://ajw.asahi.com/article/views/editorial/AJ201602270026

Kansai Electric Power Co. restarted the No. 4 reactor at its Takahama nuclear power plant in Fukui Prefecture on Feb. 26.
The 870-megawatt pressurized water reactor became the fourth to resume operations since stricter safety guidelines were introduced after the 2011 Fukushima nuclear disaster triggered by the Great East Japan Earthquake and tsunami.
The No. 1 and No. 2 reactors at Kyushu Electric Power Co.'s Sendai nuclear power plant in Kagoshima Prefecture, as well as the No. 3 reactor at the Takahama facility, had already been brought back online.
The No. 4 reactor at the Takahama plant, like the No. 3 reactor, uses mixed-oxide (MOX) fuel consisting of plutonium and uranium to generate electricity.

What concerns us is whether local residents will be safely and smoothly evacuated in the event of a severe accident at the plant. The decision to resume operations is highly questionable in light of the lessons learned from the calamitous accident at the Fukushima No. 1 nuclear power plant.
Earlier this month, a small amount of radioactive water was found to have leaked near purification equipment installed in the auxiliary structure of the No. 4 reactor building during a test to send water down the primary coolant pipe connected to the reactor.
The cause of the leak was a loose bolt in a valve, according to the utility.
The triple meltdown at the Fukushima plant five years ago has made Japanese far more aware of safety concerns when it comes to nuclear power generation.
Kansai Electric claims it has checked all other valves. Even so, the utility must realize it is assuming a heavy responsibility with regard to the overall safety of the reactor it has restarted.
Operating a reactor inevitably produces additional spent nuclear fuel. What is needed now is a fresh, hard look at the intractable challenge of what to do with nuclear waste.
At Kansai Electric's Takahama, Mihama and Oi nuclear plants, about 70 percent of the capacity of the spent fuel pools is already in use. If all nine reactors at these plants are brought back on stream, the storage pools will reach their capacity limit in seven to eight years.
Under the government's nuclear fuel recycling program, spent fuel is supposed to be reprocessed at a special plant in Rokkasho, Aomori Prefecture, to separate plutonium for fresh use as fuel.
But the completion of the reprocessing plant has been delayed repeatedly, with no prospect of actual operation.
In addition, spent MOX fuel produced by a reactor burning a mix of uranium and plutonium in plutonium-thermal (pluthermal) operations cannot be reprocessed at the Rokkasho plant.
Since the government has made no decision with regard to the disposal of spent fuel, the utility can only store used MOX within the plant, at least for the time being.
The consequences of postponing a decision on how to tackle these vital problems are now making themselves felt.
Consumers, for their part, have long taken for granted that atomic energy will generate much of the electricity they consume. They should not simply foist the responsibility for dealing with the problems on the government or the utilities.
Society as a whole needs to show a sense of responsibility by getting involved in debate on the future of nuclear waste disposal in this country.
People in the Kansai region served by the utility and Fukui Prefecture, where the reactors are located, may be in a position to take the leadership in initiating the debate.
Worried about the expected increase in spent nuclear fuel at the plant, the Fukui prefectural government is calling on Kansai Electric and the central government to build an interim storage facility outside the prefecture.
Last November, the company promised to decide on the location of such a facility around 2020 and start operating it around 2030.
The utility has indicated its intention to build the envisioned storage facility in the Kansai region, which consumes the electricity generated at the plant. But no local government in the region has expressed any willingness to accept such a site.
This surely is an issue the communities that use the power should tackle.
Kansai Electric may as well propose talks over the issue with the Union of Kansai Governments, composed of the governors of the prefectures and the mayors of the ordinance-designated cities in the Kansai region.
If the Fukui prefectural government is also allowed to sit at the negotiating table, it will be a first step toward mending the relationship between areas where nuclear power plants are located and markets for power generated at the plants. The relationship has been strained by the Fukushima nuclear disaster.
We realize the talks would not produce any real solution quickly. But it is no longer possible to avoid addressing the issue.

March 9, 2016

Still no storage site for Fukushima waste

Waste storage site yet to be secured in Fukushima

http://www3.nhk.or.jp/nhkworld/en/news/20160309_22/

Japan's government is required to speed up its work to secure land for storing soil and other materials contaminated in the Fukushima Daiichi nuclear accident nearly 5 years ago.

The government removed such materials from roads, fields, residential areas and elsewhere around the plant.

It plans to build a facility to store such waste for about 30 years on a plot measuring about 16 square kilometers in Futaba and Okuma towns, near the crippled plant. But it has secured only about 2 percent of the land for the intermediate storage facility.

Only 69 of about 2,300 owners of the land have signed contracts with the government.

About 40,000 cubic meters of radioactive waste, or only 0.2 percent of the total, has been taken to a storage area for the planned facility.

Tainted waste is stored at about 1,100 initial sites across Fukushima Prefecture. Such waste is also kept at 127,000 other sites including decontaminated residential gardens.

April 27, 2016

Final disposal in Genkai?

Genkai mayor ready to accept final disposal facility for nuclear waste

http://mainichi.jp/english/articles/20160427/p2a/00m/0na/014000c

Hideo Kishimoto, the mayor of Genkai, Saga Prefecture, that hosts Kyushu Electric Power Co.'s Genkai Nuclear Power Plant, told the Mainichi Shimbun on April 26 that he was willing to accept a government plan to build a final disposal facility for highly radioactive nuclear waste in his town.
The central government is planning to show a location deemed proper for a final disposal site as early as the end of this year. Genkai Mayor Kishimoto said in an interview with the Mainichi, "If the town is shown as a proper place, I would like to hold a briefing session for townspeople and hold talks with the state."
In 2007, the mayor of the Kochi Prefecture town of Toyo applied for a candidate site for a final disposal facility, but his proposal failed to get off the ground due to opposition. No local governments or heads of municipalities have since openly expressed their positive stance toward hosting a final disposal site. Therefore, the remarks by Genkai Mayor Kishimoto are certain to spark controversy.

On the occasion of the first anniversary on April 27 of the decommissioning of the Genkai No. 1 nuclear reactor, Mayor Kishimoto spoke to the Mainichi over two interviews on April 21 and 26, clearly stating that accepting a final disposal facility would be "one of the options."
In a questionnaire survey conducted by the Mainichi in July 2015 of municipalities hosting nuclear plants across the country, the Genkai Municipal Government replied that it would "turn down" if it was asked by the central government to accept a final disposal facility in the town. Regarding this, Kishimoto said, "We were thinking that there was no land to build a disposal site on." He added, however, that partly because a working group of the Economy, Trade and Industry Ministry showed a method on April 19 of burying a final disposal facility beneath the ocean floor in a coastal area, he changed his way of thinking. "I became positive. I think it is technically possible."
Kishimoto also said that he has become positive toward accepting a final disposal facility partly because of revenue cuts being caused by reduced subsidies and property tax revenue stemming from the decommissioning of the Genkai No. 1 nuclear reactor. He also said that Genkai registered only 2 to 3 on the Japanese intensity scale of 7 when two earthquakes measuring 7 on the intensity scale hit parts of Kumamoto Prefecture.
Some Genkai citizens were puzzled by Kishimoto's unexpected remarks. Kido Chushu, 86, who is involved in anti-nuclear activities in Genkai, said, "Can they take responsibility in the future as this is an issue that involves 100 and 200 years from now?"
Akira Fujiura, a 79-year-old Genkai Municipal Assembly member from the Japanese Communist Party, said, "We must never allow them (to build a final disposal facility). The final disposal of nuclear waste is not an issue just for 10 or 100 years."

May 26, 2016

For at least 100,000 years...

Low-level nuclear waste to be buried 70 meters underground: NRA

http://mainichi.jp/english/articles/20160526/p2a/00m/0na/015000c

A portion of low-level nuclear waste generated by nuclear reactors is to be buried at a depth of 70 meters underground until it is nearly no longer radioactive some 100,000 years from now, the Nuclear Regulation Authority (NRA) said on May 25.
NRA officials announced the strategy as forming the organization's key policy with respect to its regulatory standards.
The low-level nuclear waste materials to be buried are those with a high degree of contamination, including parts inside the reactor that are located close to the fuel rods.
According to the policy, reactor operators will be expected to oversee the waste for a total of 300 to 400 years after it is buried -- at which time they will be expected to conduct regular inspections on potential leaks of radioactive materials into the groundwater.
In order to ensure that human beings do not come anywhere near the radioactive waste materials, the government also plans to implement policies restricting nearby excavations, as well as advising that the nuclear waste not be buried near spots that have the potential for large-scale damage -- including volcanoes and active faults -- for at least the next 100,000 years.
The NRA will begin soliciting opinions on May 26 for a period of around one month as it aims to formulate concrete regulatory standards in this regard.

July 5, 2016

Risk of illegal dumping

July 5, 2016 (Mainichi Japan) Japanese version

Piles of black bags containing radioactive soil are seen at a temporary storage site in Minamisoma, Fukushima Prefecture, on June 11, 2016. The Environment Ministry is set to conduct a demonstration experiment there possibly later this year, in which radiation doses will be measured on mounds using soil generated from decontamination work. (Mainichi)

Reuse of radioactive soil feared to trigger illegal dumping

http://mainichi.jp/english/articles/20160705/p2a/00m/0na/012000c

An Environment Ministry decision to allow reuse of radioactively contaminated soil emanating from the Fukushima nuclear disaster in public works projects has prompted experts to warn against possible dumping of such soil under fake recycling.

- 【Related】Ministry green-lights reuse of radioactive soil for public works projects
- 【Related】Reuse of radioactive soil approved despite 170-year safety criteria estimate
- 【Related】Photo Journal: Radioactive soil storage

The ministry formally decided on June 30 to allow limited use of soil generated from decontamination work after the Fukushima No. 1 nuclear power plant disaster in mounds under road pavements and other public works projects, as long as the soil contains no more than 8,000 becquerels per kilogram of radioactive cesium. The decision was made despite questions raised during a closed meeting of the ministry over incompatibility with the decontamination criteria for farmland soil.
The Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors sets the safety criteria for recycling metals and other materials generated from the decommissioning of nuclear reactors at no more than 100 becquerels per kilogram, and requires materials whose radiation levels exceed that level to be buried underground as "radioactive waste." The figure of 100 becquerels is derived from the International Commission on Radiological Protection's standards that annual radiation exposure of up to 0.01 millisieverts poses negligible health risks.

However, the Fukushima disaster has disseminated radioactive materials outside the crippled nuclear plant across far wider areas than expected. Under the special measures law on decontamination of radioactive materials, which was fully put into force in January 2012, waste whose radiation levels top 8,000 becquerels per kilogram is called "designated waste" and must be treated by the government, while waste with radiation levels of 8,000 becquerels or lower can be treated in the same way as regular waste. The figure of 8,000 becquerels comes from the upper limit of annual radiation exposure doses for ordinary citizens under the reactor regulation law, which is set at 1 millisievert. Regarding the double safety standards of 100 becquerels and 8,000 becquerels, the Environment Ministry had earlier explained that the former is for "reuse" and the latter for "waste disposal."
However, the recent Environment Ministry decision to allow the reuse of contaminated soil in public works projects runs counter to its earlier explanation. The ministry is trying to reconcile that difference by insisting that the radiation levels of tainted soil could be kept under 100 becquerels if mounds using such soil were covered with concrete and other materials to shield radiation. During a closed meeting of the ministry that discussed the matter, some attendants raised questions over inconsistencies with the decontamination criteria for farmland soil.
In April 2011, in the aftermath of the Fukushima meltdowns, the Ministry of Agriculture, Forestry and Fisheries restricted rice planting in paddies whose radiation levels topped 5,000 becquerels per kilogram of soil. While the restriction was effective for just one year, the same criteria has been in place for ensuing decontamination, where surface soil of more than 5,000 becquerels is removed and surface soil under that level is replaced with deeper layers.
It is inconsistent to strip away soil of more than 5,000 becquerels while recycling soil with the same level of radiation. However, attendants of the closed meeting never discussed the matter in detail, nor did the issue come up for discussion at an open meeting.
The radioactivity concentration of contaminated soil is higher than that of earthquake debris, whose treatment caused friction across the country on the heels of the Fukushima crisis. Therefore, officials attending an open meeting of the ministry discussed the introduction of incentives for users of tainted soil, with one saying, "Unless there are motives for using such soil, regular soil would be used instead."
Kazuki Kumamoto, professor at Meiji Gakuin University specializing in environmental policy, criticized the ministry's move, saying, "There is a high risk for inverse onerous contracts, in which dealers take on contaminated soil in exchange for financial benefits." There have been a series of incidents involving such contracts, in which waste was pressed upon dealers under the guise of "recycled materials," such as backfill material called ferrosilt and slag generated from iron refining.
"If contaminated soil was handed over under inverse onerous contracts, there is a risk that such soil could be illegally dumped later. Reuse of tainted soil would lead to dispersing contamination," Kumamoto said.

July 22, 2016

Chiba nuke waste "not radioactive"

7.7 tons of Chiba's Fukushima waste won't be deemed radioactive anymore, clearing way for general disposal

http://www.japantimes.co.jp/news/2016/07/22/national/7-7-tons-of-chibas-fukushima-waste-wont-be-deemed-radioactive-anymore-clearing-way-for-general-disposal/#.V5Rh5RHr1_8

JIJI

CHIBA – The government on Friday informed the city of Chiba that the radioactive designation for 7.7 tons of Fukushima-tainted waste stored in the city will be lifted on Saturday, allowing it to be treated as general garbage.
State Minister of the Environment Shinji Inoue conveyed the decision to Chiba Mayor Toshihito Kumagai during a meeting at City Hall in Chiba Prefecture's capital.
The decision came after it was found that the radioactive activity of cesium in the waste had fallen below the state-set limit of 8,000 becquerels per kilogram.
It will be the first time for such a designation to be lifted for such waste.
The waste was part of the aftermath of the massive earthquake and subsequent tsunami of March 2011, which triggered a triple core meltdown at the Fukushima No. 1 power plant. The defunct plant is owned by Tokyo Electric Power Holdings Inc.
Some 3,700 tons of designated radioactive waste created by the man-made meltdowns, including incineration ash, is stored in Chiba. The 7.7 tons in question is sitting in a garbage disposal facility in Mihama Ward in Chiba.
The lifting of the designation will allow the city to dispose of the waste in the same way as general waste. But Kumagai has expressed his intention to keep it in storage for the time being.
As of the end of March, 172,899 tons of such designated waste was being stored in Chiba, Tokyo and 10 other prefectures in eastern Japan.

See also :

http://www.fukushima-is-still-news.com/2016/06/lifting-the-designation-as-radioactive-waste.html
http://www.fukushima-is-still-news.com/2016/07/in-chiba-radioactive-is-no-longer-radioactive.html

August 5, 2016

Storage facilities & Government promises

Japan's new environment minister pledges to build trust, contaminated waste storage facility in Fukushima

http://www.japantimes.co.jp/news/2016/08/05/national/japans-new-environment-minister-pledges-build-trust-contaminated-waste-storage-facility-fukushima/#.V6WC-KJdeos

by Kazuaki Nagata

Staff Writer
Newly appointed Environment Minister Koichi Yamamoto said Friday he will further efforts to build trust with people in Fukushima Prefecture to facilitate a stalled project to build a temporary nuclear storage facility.
The 2011 triple meltdown at the Fukushima No. 1 nuclear power plant has contaminated a large part of the prefecture while massive amounts of radioactive waste have been generated by decontamination work.

The government is planning to construct a huge temporary storage site near the Fukushima plant, but needs more than 2,300 landowners to agree to use their property for the project. So far it has only secured about 4.9 percent of the 1,600 hectares of land needed, owned by 234 people.
Although the government says it plans to store the waste for 30 years, no other areas have volunteered to host a final disposal site, leading many local residents to fear that the Fukushima site will end up being permanent.
"I'm aware that getting landowners' consent is a very tough issue," said Yamamoto, 68, a veteran Liberal Democratic Party lawmaker, during a media interview.
Yamamoto has learned from ministry officials that the situation is improving, and hopes to accelerate the momentum.
Storing contaminated waste at the site is crucial for Fukushima's reconstruction work, which is currently stalled due to large amounts of waste piling up around the prefecture.
Meanwhile, some landowners are reportedly questioning the government's commitment on this matter, as environment ministers have already changed four times since Prime Minister Shinzo Abe took office in December 2012.
But Yamamoto said the ministers have handled affairs properly. "This administration has been led by the LDP, so of course we have continuity and even (if) the minister changes (often), we share the same thoughts," said Yamamoto.
He said 99 percent of the handover information he received from his predecessor, Tamayo Marukawa, was about Fukushima-related issues. "I have to make efforts to go to Fukushima often to make stronger connections than Marukawa did," he said. Yamamoto plans to visit the temporary storage facility on Tuesday.
The government hopes to begin construction of the temporary storage site in October, the ministry said.

August 12, 2016

Looking for final disposal site (2007...)

Japan Plans To Identify 'Multiple Candidate Sits' For Repository

http://www.nucnet.org/all-the-news/2016/08/12/japan-plans-to-identify-multiple-candidate-sits-for-repository

The Japanese government wants to identify "multiple candidate sites" for a deep geological radioactive waste repository by the end of the year, the Japan Atomic Industrial Forum (Jaif) said. A technical working group formed by Japan's Advisory Committee for Natural Resources and Energy has published an interim report which reevaluates possible technology for the geological disposal of high-level radioactive waste (HLW), Jaif said. The report classifies various potential sites into three groups according to their suitability. Jaif said the report will be finalised after it has been made available for public comment. "It should then contribute to the mapping of scientifically promising sites across Japan," Jaif said. Japan has around 17,000 tonnes of HLW in spent fuel pools. Japan's Nuclear Waste Management Organisation, known as Numo, has been searching for a permanent HLW storage site for years, initially inviting districts to apply as a host. In 2007, the mayor of a town called Toyo, in Kochi Prefecture, southern Japan, registered the town's interest, but Toyo's residents opposed the idea and voted him out of office. His successor cancelled the plan. In May 2015 Numo abandoned the idea of waiting for a volunteer. Instead, scientists will nominate suitable regions. According to Numo, Japan wants to start construction of a repository in 2025 and have the facility operational by between 2033 and 2037.

See also this **article dated June13, 2007**:

Discussions Resume On Finding Japan Final Disposal Site

Discussions have resumed aimed at finding a final disposal site for Japan's high-level radioactive waste (HLW), with plans to have the facility operational by 2037.
The Japan Atomic Industrial Forum said the Electric Utility Industry Subcommittee's working committee on radioactive waste met for the tenth time and will meet several more times before preparing an interim report on the search for a disposal site by around August 2007.

According to Japan's Nuclear Waste Management Organisation (NUMO), the organisation in charge of implementing final disposal policy, Japan wants to start construction of a repository in 2025 and have the facility operational by between 2033 and 2037.

The town of Toyo in Kochi prefecture in the south of the country has formally offered to host the facility.

But committee members heard there have been problems reaching a consensus on potential sites because of reaction from opposition groups and objections by local governors.

The Toyo application is supported by the town's mayor, but opposed by the Kochi prefecture governor. About 60 percent of Toyo residents have signed a petition against the initiative.

In February 2007 NUMO said it planned to have a high-level waste facility in operation through a voluntary site selection process.

While no committee members called for a review of the voluntary system, it was suggested the government should also look for possible sites in areas that already have nuclear energy facilities.

Masaru Kitano, a professor at Meiji University, told the committee the final decision should be in the hands of the citizens. It was also proposed that the siting decision could be part of a package, with a research institute included.

Meanwhile, a bill revising sections of Japan's final disposal policy was passed by the Japanese Diet (parliament) on 6 June and will take effect within one year. The bill includes a provision calling for the selection of a HLW disposal site without delay.

- >>Related reports in the NucNet database (available to subscribers)

  Japan: Approval Given For Radwaste Disposal Organisation (Business News No. 117.2, 20 October 2000)

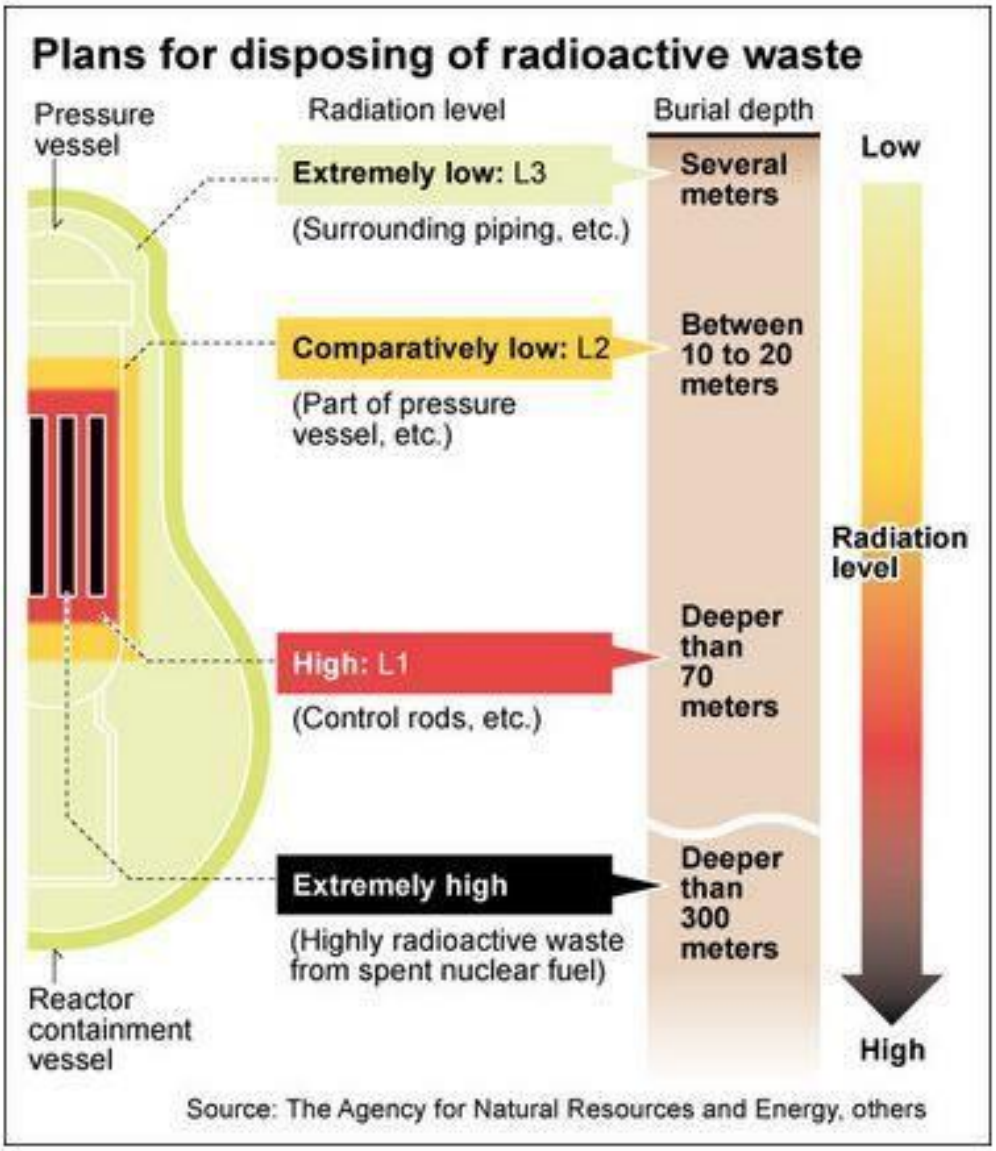
  Japan's Nuclear Share Could Exceed 40 Percent By 2030, Says Report (News No. 103, 16 May 2006)

  Japanese Town Starts Process To Host High-Level Waste Facility (News No. 29, 1 February 2007)

  The NucNet database currently contains more than 12,000 reports published since 1991. To subscribe or ask for any further information email info@worldnuclear.org

September 2, 2016

70 meters underground for 100.000 years



The Asahi Shimbun

NRA wants high-risk nuclear waste buried for 100,000 years

http://www.asahi.com/ajw/articles/AJ201609020034.html

By TAKASHI SUGIMOTO/ Staff Writer

Highly radioactive waste from the decommissioning of nuclear reactors should be buried at depths beyond 70 meters for 100,000 years, the Nuclear Regulation Authority has decided.

Under the decision made Aug. 31, nuclear waste that would mainly consist of the control rods used in nuclear reactors would be buried in areas where earthquakes and volcanoes pose a minimal threat.

Electric power companies would be responsible for managing the buried waste for periods between 300 and 400 years. The central government would then take over and restrict entry and digging in the burial sites for a period of 100,000 years.

The NRA divides nuclear waste from the decommissioning process into four major categories depending on the radiation level: extremely high, high (L1), comparatively low (L2) and extremely low (L3).
The Aug. 31 decision applies to L1 waste. Disposal methods had already been decided for the other categories.
Nuclear waste categorized as having extremely high radiation levels is mainly from spent nuclear fuel. L2 level waste would mainly come from part of the reactor pressure vessel while L3 waste would be from piping surrounding the pressure vessel.
The depths at which waste is buried differs according to the radiation level.
Nuclear waste with extremely high radiation levels has to be buried deeper than 300 meters for a period of 100,000 years.
L2 waste will be buried at a depth between 10 and 20 meters, while L3 waste will be buried several meters underground.
The Federation of Electric Power Companies of Japan had calculated that if all 57 nuclear reactors in Japan were decommissioned, a total of about 8,000 tons of L1 nuclear waste would be produced.
The NRA concluded that there was a necessity to encase L1 waste in concrete and bury it in bedrock deeper than 70 meters for at least 100,000 years.
The period in which electric power companies would manage the waste was set at between 300 and 400 years because a period of several tens of thousands of years is unrealistic.
Even though the burial methods have been decided on, the much more difficult task of deciding on which burial sites to use must still be resolved.
The electric power companies must acquire the sites to be used to bury nuclear waste.
Decommissioning work has begun at the Tokai reactor in Ibaraki Prefecture, once operated by the Japan Atomic Power Co.
The company received local approval in January 2016 for burying only L3 waste within the reactor grounds.
That is the only decision so far by any local community in Japan for accepting the burial of nuclear waste in their backyard. No local government has given the green light for a site to be used to bury L2 or L1 waste.
Consideration is also being given to possible burial sites for nuclear waste with extremely high radiation levels.
The sites have to be distant from volcanoes and active faults, but also in locations where transporting the waste would not be difficult.
That has led to the inclusion of a condition that the sites be within 20 kilometers of the coastline to be considered "highly appropriate" as a burial site.
The central government plans to present by the end of 2016 a map of possible sites that would be considered "scientifically promising" for the disposal of waste with extremely high radiation levels.

The 100.000 years curse

VOX POPULI: A curse that lasts 100,000 years: buried nuclear waste

http://www.asahi.com/ajw/articles/AJ201609020033.html

Vox Populi, Vox Dei is a daily column that runs on Page 1 of The Asahi Shimbun.
Homo sapiens sapiens, or anatomically modern humans, emerged on the African continent about 200,000 years ago. They started migrating to various parts of the globe around 60,000 years ago with some eventually reaching the Japanese archipelago.
The Paleolithic era came and went, and rice cultivation began in the Neolithic era.

I started thinking about these prehistoric times after a recent news report mentioned "100,000 years" in connection with radioactive waste that must be disposed of when nuclear reactors are dismantled.
It takes a mind-boggling number of years for nuclear waste, stored deep underground, to decrease in radioactivity to a level that is no longer a health hazard.
With respect to highly radioactive waste such as reactor control rods, the Nuclear Regulation Authority has just set its basic policy, which is that electric power companies will be responsible for the management of such waste for 300 to 400 years, and then the government will take over for the next 100,000 years.
Every precaution must be taken to prevent future humans from accidentally entering sites where the waste is buried and digging the ground. The potential effects of earthquakes and volcanic eruptions on the stored waste also has to be considered.
In determining the extent of responsibility to be shouldered by utilities, it was agreed that it would not be realistic to expect them to manage the storage sites for tens of thousands of years to come.
According to "Hyakunen Tsuzuku Kigyo no Joken" (Conditions necessary for businesses to last 100 years) compiled by Teikoku Databank, a corporate credit research and database service company, there are some, but not many, Japanese companies that have remained in business for more than 400 years.
They include Sumitomo Metal and Mining Co., Yomeishu Seizo Co., and Matsuzakaya, which were founded before or during the Edo Period (1603-1867).
Are Japan's electric power companies also destined to join their ranks?
But whether it's 400 years or 100,000 years from now, nobody in our present generation can remain responsible for all those years. I shudder at this "ultrarealistic" reality.
Incidentally, Japan's first nuclear reactor commenced commercial operation 50 years ago.

November 15, 2016

Expected to start accepting

Work starts in Fukushima on intermediate waste facility

http://www.asahi.com/ajw/articles/AJ201611150040.html

The planned site for an intermediate storage facility of radiation-contaminated waste spans the towns of Futaba and Okuma and surround the crippled Fukushima No. 1 nuclear power plant in Fukushima

The Environment Ministry on Nov. 15 started building a facility in Fukushima Prefecture that will store radiation-contaminated debris for up to 30 years, despite obtaining permission for only 11 percent of the site.

The 16-square-kilometer storage facility is expected to hold up to 22 million cubic meters of materials contaminated by radioactive fallout from the disaster at the Fukushima No. 1 nuclear power plant in March 2011.

"I hope that you take pride in this project and cooperate to construct the facility," Tadahiko Ito, a vice environment minister, told workers.

The facility, which will span the towns of Futaba and Okuma, is expected to start accepting, sorting and storing the debris in autumn 2017 at the earliest, more than two-and-a-half years later than the initial schedule of January 2015.

The project has been delayed because the ministry has faced difficulties buying or borrowing land for the project.

In fact, only 445 of the 2,360 landowners of plots at the site have agreed to sell or lend their properties to the ministry for the storage facility as of the end of October.

Many of the reluctant landowners, who possess 89 percent of the land, fear the contaminated waste will remain at the facility well beyond 30 years.

The government has worked out a bill stipulating that contaminated materials kept in the intermediate storage facility will be moved out of Fukushima Prefecture in 2045. However, the government has yet to decide on the location of the final disposal site.

A huge cleanup operation after the triple meltdown at the Fukushima nuclear plant collected tons of radioactive soil and debris.

In March 2015, the ministry borrowed land and created a "temporary storage place" within a 16-square-km site on an experimental basis.

However, only about 70,000 cubic meters of the waste has been taken to the temporary storage site as of the end of October. The remaining waste, exceeding 10 million cubic meters, is being tentatively stored at about 150,000 locations in the prefecture.

"If the transportation of contaminated materials to the intermediate storage facility proceeds, the waste currently stored in residential areas and at company compounds will be transported there," said an official of the Fukushima prefectural government's section in charge of decontamination.

November 26, 2016

Dealing with radioactive waste

Radioactive waste from Fukushima plant water piling up with no final destination

http://mainichi.jp/english/articles/20161126/p2a/00m/0na/004000c

FUKUSHIMA -- While contaminated water continues to accumulate at the crippled Fukushima No. 1 Nuclear Power Plant, radioactive waste retrieved from that water during purification work is becoming a serious concern for the nuclear facility.

Since there is currently no way of dealing with the waste, plant operator Tokyo Electric Power Co. (TEPCO) has stored it onsite as a temporary measure. But there are fears in Fukushima Prefecture that it may be left there for good.

Contaminated water builds up every day at the Fukushima No. 1 plant as groundwater flows into the reactor buildings where melted fuel from the Fukushima nuclear disaster lies. Since this contaminated water could flow into the sea, TEPCO processes it with several types of purification equipment, and reuses it to cool the No. 1 to 3 reactors.

Tainted water in the reactor buildings is pumped into the U.S. cesium absorption apparatus Kurion and Toshiba Corp.'s Simplified Active Water Retrieve and Recovery System (SARRY) to remove radioactive cesium and other materials. The water is then desalinated and sent through the Advanced Liquid Processing System (ALPS), which can remove 62 different types of radioactive substances.

This process, however, does not eliminate the radioactive materials themselves; they are soaked up by absorbents, such as minerals. Radioactive materials build up in these absorbents, which remain as waste emitting high levels of radiation. This type of waste is stored in metal containers that isolate the radiation. As of Nov. 10, there were 178 such containers at the SARRY processing area, 758 at Kurio and 2,179 at ALPS. The size of the containers differs depending on the area, but overall, it amounts to some 11,000 cubic meters -- which would fill around 30 25-meter swimming pools. These containers of waste stand in a temporary storage area on the south side of the plant's No. 4 reactor.

Isao Yamagishi, a group leader at the Japan Atomic Energy Agency, warns, "Waste produced during water purification work is highly radioactive, and so is the risk of just keeping it in storage." This is

because even if the tainted water goes through a desalination process, salt can remain in the waste. There is a risk of the waste containers exploding if the concentration of hydrogen in them -- produced due to the effects of radiation on water -- reaches a certain level. Such a phenomenon was seen at the No. 1 and 3 reactor buildings of the Fukushima No. 1 plant, which exploded due to an accumulation of hydrogen soon after the outbreak of the disaster.
Yamagishi says that salt content has a tendency to aid hydrogen production, and it is necessary to release a sufficient amount of hydrogen from the containers. It is also possible that salt could corrode the metal containers. There do not seem to be any problems with hydrogen concentration or corrosion at this stage, but Yamagishi says, "We need to research over the long term what's going on inside the containers."
There is additional nuclear waste at the plant, too. Soon after the outbreak of the nuclear disaster, a decontamination system provided by France's Areva SA was put into operation, and approximately 597 cubic meters of radioactive waste produced during the water purification process with this system remains stored at the plant.
The Nuclear Regulation Authority says that if the Fukushima plant is hit by another major tsunami, this waste could end up outside the plant. It therefore needs to be dealt with quickly, but there is nowhere for it to go.
Contaminated water also poses a problem. The ALPS system cannot remove radioactive tritium from the water, so tritium-tainted water is stored in tanks. There are about 1,000 tanks holding this type of water, whose total weight amounts to some 900,000 metric tons. And as work to decommission the plant's reactors increases, both the amount of nuclear waste and the amount of contaminated water will increase.
Shigeaki Tsunoyama, former president of the University of Aizu in Fukushima and head of the Fukushima Prefectural Center for Environmental Creation, who is familiar with the field of nuclear safety engineering, comments, "Locals are concerned that nuclear waste will be left there as it is."
In the future, work will begin to remove melted fuel at the Fukushima No. 1 plant, but its destination remains undecided. Some locals fear that if no destination for waste designated as being in "temporary storage" at the plant is decided, then Fukushima will become the final disposal site for melted fuel in the future. Tsunoyama is calling on officials to provide a map for the future.
"I want them to analyze the long-term risks, and provide an outlook for the storage and disposal of waste," he says.

Editorial: Move forward with construction of interim storage sites for nuclear waste

http://mainichi.jp/english/articles/20161126/p2a/00m/0na/006000c

Construction of the main unit of interim storage facilities for radioactive soil and other waste produced during decontamination work in the wake of the Fukushima nuclear disaster has begun in the Fukushima Prefecture towns of Okuma and Futaba.

- 【Related】Radioactive waste from Fukushima plant water piling up with no final destination

Over two years have passed since the prefecture agreed on construction of the facilities, and it's nearly six years since the outbreak of the disaster triggered by the March 2011 Great East Japan Earthquake and tsunami. As interim storage facilities play an important role in Fukushima's recovery from the nuclear disaster, any further delays in building them are impermissible.
We hope that the government will steadily work toward putting the facilities into operation while maintaining safety.

The interim storage facilities will be placed around Tokyo Electric Power Co.'s crippled Fukushima No. 1 Nuclear Power Plant. They will cover a total area of about 1,600 hectares, storing up an estimated 22 million cubic meters of waste that will be moved there and administered for up to 30 years.
The reason that construction of the facilities has been delayed is that officials have had trouble negotiating with many of the approximately 2,360 landowners in the area. At first officials didn't know where many of those people had evacuated. As of the end of October this year, the Ministry of the Environment had signed land acquisition deals with 445 landowners, but the total area of land amounted to only about 170 hectares.
Under the latest development, about 7 hectares of land in Okuma and Futaba will be used to build a facility to measure the radioactivity of contaminated soil and a facility to store tainted soil. The Ministry of the Environment hopes to begin storing waste at the interim facility in autumn next year, but the storage capacity in both towns stands at about 120,000 cubic meters, far below the expected peak.
At present some 12 million cubic meters of contaminated soil remains temporarily stored at around 15 locations in Fukushima Prefecture, including temporary storage sites and the gardens of people's homes.
The Environment Ministry in March this year presented an outlook which stated that it would be possible to transport up to about 12.5 million cubic meters of waste to interim storage facilities by fiscal 2020, but this is based on the major assumption that it will acquire more land. To reach this figure, its only option is to carefully explain to landowners why the facilities are needed, and obtain their consent. There are about 110 land negotiators at the ministry, but there is probably a need to boost this team.
In addition to land negotiations, we hope to see progress in technology to reduce and reuse contaminated soil.
It has been decided that contaminated soil in storage will be moved out of Fukushima Prefecture within 30 years, but the final storage site has still not been decided.
Radioactive cesium easily attaches itself to tiny particles. Dividing up the contaminated soil by particle size and chemically processing the particles to remove the cesium could reduce the amount of soil that needs to go to the final storage destination. The Ministry of the Environment hopes to make advancements in this type of technology and use soil with low concentrations of radiation in the construction of soil bases for public works projects. But it would be a stretch to say it has obtained society's consensus to do this.
The first priority is to determine how much contaminated soil there will be and what level of radioactivity it will have at the time when the waste is moved to a final storage site. Based on those findings, officials will need to initiate procedures to win the public's approval on the location of a final disposal site and the reuse of contaminated soil.

December 23, 2016

Restarting work at WIPP

New Mexico OKs restart of America’s only underground nuke waste dump after 2014 radiation leak

http://www.japantimes.co.jp/news/2016/12/23/business/new-mexico-oks-restart-americas-underground-nuke-waste-dump-2014-radiation-leak/#.WFz8Kn2Dmic

AP

ALBUQUERQUE, NEW MEXICO – New Mexico regulators have approved restarting normal operations at the nation's only underground nuclear waste repository, a major step for U.S. officials aiming to reopen the facility nearly three years after a radiation leak shut it down indefinitely.
Two letters obtained Thursday by The Associated Press outline the state Environment Department's findings from a recent inspection of the Waste Isolation Pilot Plant. Regulators found two minor permit violations but said those were addressed immediately.
The site run by the U.S. Energy Department has been closed since a radiation release in February 2014 contaminated much of the underground disposal area. The leak stemmed from a chemical reaction inside a container of waste.
The shutdown halted the shipment of tons of Cold War-era waste from sites across the country, compromising the government's multibillion-dollar cleanup campaign and resulting in an overhaul of policies and procedures across the nuclear complex.
The price tag for mitigating the contamination at the site in southeastern New Mexico is expected to exceed a half-billion dollars, which does not include costs stemming from a multimillion-dollar settlement with the state for numerous permit violations.
All provisions of the settlement will remain in effect until they are fulfilled, Kathryn Roberts, director of the state's Resource Protection Division, wrote in one of the letters sent last week to Energy Department officials.
The state also noted that federal officials and the contractor that manages the repository must begin monitoring for volatile compounds when they begin moving waste into underground disposal rooms.
While state approval is key to restarting work at the Waste Isolation Pilot Plant, federal officials still need to address numerous issues identified as part of a separate readiness review done by Energy Department experts from elsewhere around the country.
Federal officials have pushed to resume some work by the end of the year, but it's not clear whether they will meet that deadline.

December 25, 2016

5,000 meters down?

Nuclear waste could be buried at greater depth

https://www3.nhk.or.jp/nhkworld/en/news/20161225_17/

An agency affiliated with the Japanese government is to study the possibility of burying nuclear waste at a depth of about 5,000 meters. That's much deeper than proposed in the government's current plan.

Researchers from the Japan Agency for Marine-Earth Science and Technology, or JAMSTEC, will carry out a basic survey for the new disposal option after next April.

The survey will be conducted at Minamitorishima, a remote island above the geologically stable Pacific Plate.

JAMSTEC says it will use a research vessel to collect data on the topography and geology of the area.

No technology exists to bury nuclear waste 5,000 meters below ground as there are many technical challenges.

The Japanese government has been planning to bury high-level radioactive waste from nuclear plants

at a depth of more than 300 meters in final disposal facilities. Officials are currently looking for candidate sites.

Nagasaki University Professor Tatsujiro Suzuki is a former member of Japan's Atomic Energy Commission. He says it is too soon to discuss a technology that has yet to be developed, but he thinks basic research by the agency could help to create more options.

January 9, 2017

NRA questions Gov't proposal to reuse radioactive soil

Bags containing contaminated soil and other materials produced through decontamination work are seen at a provisional storage site in Tomioka, Fukushima Prefecture. (Mainichi)

Nuclear watchdog questions Environment Ministry's plan to reuse radioactive soil

http://mainichi.jp/english/articles/20170109/p2a/00m/0na/012000c

The Nuclear Regulation Authority (NRA) has raised questions about the Environment Ministry's proposal to reuse radioactive soil resulting from decontamination work around the crippled Fukushima No. 1 Nuclear Power Plant due to the insufficiency of information on how such material would be managed, it has been learned.

- 【Related】Environment Ministry deleted some of its remarks from minutes on contaminated soil meet

As the ministry has not provided a sufficient amount of information, the nuclear watchdog has not allowed the ministry to seek advice from its Radiation Council -- a necessary step in determining standards for radiation exposure associated with the reuse of contaminated materials.
The Ministry of the Environment discussed the reuse of contaminated soil in closed-door meetings with radiation experts between January and May last year. The standard for the reuse of such

materials as metal produced in the process of decommissioning nuclear reactors is set at 100 becquerels of radioactive cesium per kilogram. Materials with a contamination level topping 8,000 becquerels are handled as "designated waste" requiring special treatment. In examining the reuse of contaminated soil, the ministry in June decided on a policy of reusing soil containing up to 8,000 becquerels of radioactive cesium per kilogram as a base for roads with concrete coverings.
According to sources close to the matter, the ministry sounded the NRA out on consulting with the Radiation Council over the upper limit of 8,000 becquerels and other issues. An official from the NRA requested the ministry to provide a detailed explanation on how such soil would be handled, including the prospect of when the ministry would end its management of the reused soil, and how it would prevent illegal dumping. The official then told the ministry that the rule of 100-becquerel-per-kilogram rule would need to be guaranteed if contaminated soil were reused without ministry oversight.
The official is also said to have expressed concerns over the ministry plan, questioning the possibility of contaminated soil being used in somebody's yard in a regular neighborhood. Since the ministry failed to respond with a detailed explanation, the NRA did not allow the ministry to consult with the Radiation Council.
Government bodies are required to consult with the council under law when establishing standards for prevention of radiation hazards. It was the Radiation Council that set up the 8,000-becquerel rule for designated waste.
An official from the NRA's Radiation Protection and Safeguards Division told the Mainichi Shimbun, "We told the ministry that unless it provides a detailed explanation on how contaminated soil would be used and on how it will manage such material, we cannot judge if its plan would be safe."

March 13, 2017

What about all this radioactive waste?

Tanks for storing contaminated water, with Reactors 1 and 2 in the background at the Fukushima Daiichi Nuclear Power Station in Fukushima, Japan, Feb. 21, 2017. Japanese officials wrestle with what to do with the ever-growing pile of radioactive waste at the nuclear power station, six years after the accident there. (Ko Sasaki/ © 2017 The New York Times)

Nuclear Waste's Toll And Challenge in Japan, Six Years After Disaster

http://www.asahi.com/ajw/articles/SDI201703131091.html

By MOTOKO RICH/ © 2017 The New York Times

FUKUSHIMA DAIICHI NUCLEAR POWER STATION--Six years after the largest nuclear disaster in a quarter-century, Japanese officials have still not solved a basic problem: what to do with an ever-growing pile of radioactive waste. Each form of waste at the Fukushima Daiichi Nuclear Power Station, where three reactors melted down after an earthquake and a tsunami on March 11, 2011, presents its own challenges.

400 Tons of Contaminated Water Per Day

The Tokyo Electric Power Co. is pumping water nonstop through the three reactors to cool melted fuel that remains too hot and radioactive to remove. About 400 tons of water pass through the reactors every day, including groundwater that seeps in. The water picks up radiation in the reactors and then is diverted into a decontamination facility.

But the decontamination filters cannot remove all the radioactive material. So for now, all this water is being stored in 1,000 gray, blue and white tanks on the grounds. The tanks already hold 962,000 tons of contaminated water, and Tokyo Electric is installing more tanks. It is also trying to slow the flow of groundwater through the reactors by building an underground ice wall.

Within a few years, though, and no one is sure exactly when, the plant may run out of room to store the contaminated water. "We cannot continue to build tanks forever," said Shigenori Hata, an official at the Ministry of Economy, Trade and Industry.

Authorities are debating whether it might be acceptable, given the relatively low radioactive levels in the water, to dilute the contaminated water and then dump it into the ocean. But local fishermen are vehemently opposed. Many people still do not trust Tokyo Electric because of its bungled response to the disaster, the worst nuclear accident since Chernobyl.

3,519 Containers of Radioactive Sludge

The process of decontaminating the water leaves radioactive sludge trapped in filters, which are being held in thousands of containers of different sizes.

Tokyo Electric says it cannot quantify the amount of radioactive sludge being generated. But it says it is experimenting with what to do with it, including mixing it with cement or iron. Then it will have to decide how to store it.

64,700 Cubic Meters of Discarded Protective Clothing

The estimated 6,000 cleanup workers at the site put on new protective gear every day. These hazmat suits, face masks, rubber gloves and shoe coverings are thrown out at the end of each shift. The clothing is compressed and stored in 1,000 steel boxes stacked around the site.

To date, more than 64,700 cubic meters of gear has been discarded, the equivalent of 17 million 1-gallon containers. Tokyo Electric says it will eventually incinerate all this contaminated clothing to reduce the space needed to store it.

Branches and Logs From 220 Acres of Deforested Land

The plant's grounds were once dotted with trees, and a portion was even designated as a bird sanctuary. But workers have cleared about 220 acres of trees since the meltdown spewed radiation over them.

Now, piles of branches and tree trunks are stacked all over the site. Officials say there are about 80,000 cubic meters of this waste, and all of it will have to be incinerated and stored someday.

200,400 Cubic Meters of Radioactive Rubble

Explosions during the meltdown filled the reactors with rubble. Workers and robots are slowly and carefully trying to remove this tangled mass of crushed concrete, pipes, hoses and metal.
Tokyo Electric estimates that more than 200,400 cubic meters of rubble--all of it radioactive--have been removed so far and stored in custom-made steel boxes. That is the equivalent of about 3,000 standard 40-foot shipping containers.

3.5 Billion Gallons of Soil
Thousands of plastic garbage bags sit in neat rows in the fields and abandoned towns surrounding the Fukushima plant. They contain soil that was scraped from land that was exposed to radiation in the days after the accident.
Japan's Ministry of the Environment estimates that it has bagged 3.5 billion gallons of soil, and plans to collect much more. It will eventually incinerate some of the soil, but that will only reduce the volume of the radioactive waste, not eliminate it.
The ministry has begun building a massive, interim storage facility in Fukushima prefecture and negotiating with 2,360 landowners for the thousands of acres needed to complete it. And that is not even a long-term solution: The government says that after 30 years it will need another site--or sites--to store radioactive waste.

1,573 Nuclear Fuel Rods
The ultimate goal of the cleanup is to cool and, if possible, remove the uranium and plutonium fuel that was inside the three reactors at the time of the disaster.
Hundreds of spent fuel rods are in cooling pools inside the reactors, and the company hopes to have cleared away enough rubble to begin removing them next year. The much bigger challenge will be removing the fuel that was in use in the reactor core at the time of the meltdown.
The condition and location of this molten fuel debris are still largely unknown. In one reactor where a robot was sent in January, much of the melted fuel is believed to have burned through the bottom of the inner reactor vessel and burrowed into the thick concrete foundation of the containment structure.
The plan is to completely seal the containment vessels, fill them with water and use robots to find and remove the molten fuel debris. But the rubble, the lethal levels of radiation and the risk of letting radiation escape make this an exceedingly difficult task.
In January, the robot sent into one of the reactors discovered radiation levels high enough to kill a person in less than a minute. Another had to be abandoned last month after debris blocked its path and radiation disabled it.
Tokyo Electric hopes to begin removing fuel debris from the reactor cores in 2021. The entire effort could take decades. Some say the radioactive material may prove impossible to remove safely and have suggested leaving it and entombing Fukushima under a concrete and steel sarcophagus like the one used at Chernobyl.
But the Japanese government and Tokyo Electric say they are committed to removing all the waste and cleaning the site, estimated at a cost of $188.6 billion.
"We want to return it to a safe state," said Yuichi Okamura, general manager of the company's nuclear power and plant siting division. "We promised the local people that we would recover the site and make it a safe ground again."

610 tons of spent fuel and nowhere to go

Background:
After the end of WWII, Japan was persuaded by the Allies to embrace nuclear power -- partly as a way of expiating the horror of the Atomic Bomb explosions at Hiroshima and Nagasaki, but mainly as a way of achieving energy independence. To avoid the necessity of purchasing fuels off-island, the Japanese were urged to embrace the nuclear reprocessing option. By routinely extracting plutonium and

unfissioned uranium from irradiated nuclear fuel, they were informed, new fuel could be fabricated by blending the recovered plutonium with the unfissioned uranium. This new plutonium-based fuel is called MOX – an acronym for Mixed Oxide fuel. As a result, Japan developed no plans for the long-term storage of irradiated nuclear fuel. Spent fuel was to be regarded as an energy resource rather than as nuclear waste. And as it happens, spent MOX fuel contains even larger amounts of highly toxic radioactive substances than spent uranium fuel from conventional reactors.
The **Fugen advanced converter reactor** started up in 1978. It was the first reactor in the world to use a full MOX fuel core. It had 772 MOX fuel assemblies, the most for any reactor anywhere. It has received the title of a historic landmark from the American Nuclear Society. The Fugen reactor boiled ordinary water as in standard boiling water reactor (BWR) but used heavy water as a moderator as in a CANDU reactor. The Fugen reactor was shut down permanently in 2005.
The **Monju prototype fast breeder reactor** (1994-2016) was designed to produce more plutonium as a byproduct than the plutonium it uses as a fuel. That's why it's called a "breeder". But for this breeding process to work, the fuel has to be much more "enriched" in fissile material. It has to be nuclear-weapons-usable material,, capable of sustaining a nuclear chain reaction using "fast neutrons", without the use of any moderator. That's why it's called a "fast" breeder. So, instead of using water as a.coolant (which inevitably slows down the fast neutrons) the Monju reactor uses liquid sodium (a liquid metal) as a coolant. Needless to say, the liquid sodium becomes highly radioactive, just as the primary coolant of any recator is highly radioactive.
The Monju reactor has been inoperative for most of the time since it was first built. It last operated in 2010, and last year it was decided top decommission it. The Japanese have no idea at present how to dispose of the spent fuel or the radioactiuve sodium from Monju. Radioactive sodium is yet another nuclear conundrum.
At **Fukushima-Daiichi nuclear power plant**, Unit 3 (one of the reactors that suffered a complete core meltdown) was fuelled with a heterogenous core of uranium oxide fuel and plutonium-based mixed oxide fuel (about 6 percent of the fuel was MOX). Unit 3 was the only one of the six reactiors at Fukushima-Daiichi that had MOX fuel in its core.

Gordon Edwards.

April 30, 2017

Lack of transfer sites for 610 tons of spent fuel might delay closure plans for seven reactors

http://www.japantimes.co.jp/news/2017/04/30/national/transfer-sites-610-tons-spent-nuclear-fuel-undecided-decommissioning-plans-may-affected/#.WQeClNykKie

About 610 tons of spent nuclear fuel stored at seven of the 17 reactors in Japan that are set to be decommissioned have no fixed transfer destination, it was learned Sunday, threatening to hold up the decommissioning process.
If it remains undecided where to transfer the spent nuclear fuel, work to dismantle reactor buildings and other structures may not be carried out as planned.
The tally excludes the six reactors at Tokyo Electric Power Co. Holdings Inc.'s Fukushima No. 1 plant, which was heavily damaged by the March 2011 earthquake and tsunami.
The seven reactors are
1) the Japan Atomic Energy Agency's Fugen advanced converter reactor,
2) the agency's Monju prototype fast-breeder reactor,
3) Japan Atomic Power Co.'s reactor 1 at its Tsuruga plant,

4-5) reactors 1 and 2 of Kansai Electric Power Co.'s Mihama plant,
6) reactor 1 of Chugoku Electric Power Co.'s Shimane plant and
7) reactor 1 of Kyushu Electric Power Co.'s Genkai plant,
according to the companies and the agency.
The Fugen reactor has 70 tons of spent mixed-oxide, or MOX, fuel, a blend of uranium and plutonium recycled from spent nuclear fuel.
The agency has abandoned its plans to move the MOX fuel out of the reactor site in the current fiscal year to March 2018. It has considered consigning the reprocessing of the fuel overseas but a contract has not been signed yet.
The agency's schedule to finish the decommissioning work by fiscal 2033 has remained unchanged, but an official admitted that the timetable will be affected if a decision on where to transfer the spent fuel is not made.
As for the trouble-prone Monju reactor, the agency has yet to submit a decommissioning program to authorities. How to deal with 22 tons of spent MOX fuel at the reactor is a major issue.
The Mihama No. 1 reactor has 75.7 tons of spent conventional nuclear fuel and 1.3 tons of spent MOX fuel, while the No. 2 reactor has 202 tons of spent nuclear fuel. Kansai Electric plans to take them out of Fukui Prefecture, which hosts the power plant, by fiscal 2035, but the transfer location has not yet been selected.
At the Tsuruga plant's reactor 1, Japan Atomic Power plans to transfer 31.1 tons of the reactor's 50-ton spent nuclear fuel to the fuel pool of reactor 2, with the rest to be transported by fiscal 2026 to a Japan Nuclear Fuel reprocessing plant under construction in the village of Rokkasho in Aomori Prefecture.
After being postponed more than 20 times, the completion of the reprocessing plant is currently slated for the first half of fiscal 2018 and the blueprint is undergoing screenings by the Nuclear Regulation Authority, a nuclear watchdog.
As nuclear fuel cannot be brought into the reprocessing plant until it starts operations after receiving all necessary regulatory approval, it is uncertain whether the Tsuruga reactor fuel can be transferred as planned.
Chugoku Electric aims to transfer 122.7 tons of spent nuclear fuel at its Shimane plant's reactor 1 to the Rokkasho reprocessing plant by fiscal 2029.
Kyushu Electric hopes to take 97.2 tons of spent nuclear fuel at the Genkai reactor 1 out of its fuel pool by fiscal 2029, but the destination has not been fixed.
At three other nuclear plants with reactors set to be decommissioned, spent nuclear fuel is mostly planned to be moved out of the current pools to other pools within the same plant.
In the case of Tepco's disaster-stricken Fukushima No. 1 plant, the site of the 2011 triple meltdown accident, where the 2,130 tons of spent nuclear fuel will be transferred to has yet to be decided.
Still, the decommissioning work for the six reactors there will not be affected in any significant way for the time being, as more urgent tasks, such as a survey of melted fuel, have been given higher priority, officials said.

May 15, 2017

First public symposium held in Tokyo for final disposal of nuke waste

Govt. holds symposium on nuclear disposal sites

https://www3.nhk.or.jp/nhkworld/en/news/20170515_12/

Japan's government has held a symposium on how it will choose final disposal sites for radioactive waste from nuclear power plants.

The first such event was held in Tokyo for the general public on Sunday.

Government officials explained they will draw up a map showing which parts of the country are scientifically fit for the disposal sites, based on guidelines compiled by a panel of experts.

The guidelines say the disposal sites should not be near volcanoes or active faults. The government has decided to bury radioactive waste more than 300 meters underground.

The officials also told the attendants that they will take about 20 years to conduct surveys in areas that express support for the project and then choose locations.

Some attendants questioned if the government will really obtain understanding from local communities before implementing the project. Others asked the officials to tell them about the downside of accepting the disposal sites.

The government plans to disclose the map showing locations suitable for the sites after holding similar symposiums in 8 other places and a briefing for all 47 prefectures across the country.

May 17, 2017

Reusing contaminated soil

Test to recycle some screened soil from Fukushima

https://www3.nhk.or.jp/nhkworld/en/news/20170517_23/

Japan's Environment Ministry is studying the possibility of using some screened soil cleared from Fukushima Prefecture after the 2011 nuclear power plant accident **in public works projects.**

The Japanese government says, within the next 30 years, it plans to dispose of some 22 million cubic meters of soil and other waste that will be removed from the prefecture as part of the decontamination effort.

To make the job easier, the Ministry hopes to use soil with acceptable levels of radioactive material to build roads, embankments and parks.

The ministry began testing the feasibility of such projects last month at a temporary storage site in Minami Soma, Fukushima Prefecture. The process was shown to the media on Wednesday.
The experiment involves sifting the soil to remove rocks, leaves and branches, then entering it into a machine that measures the level of radioactive substances. The soil is then piled into mounds.

Ministry officials will monitor radiation levels in the air and groundwater around the mounds.

They plan to draw up guidelines for local governments and construction workers by the end of March 2019.

The ministry says it aims to use soil with up to 6,000 becquerels per kilogram of radioactive

substances in roads and embankments, and up to 4,000 becquerels in parks.

But residents in Minami Soma have requested that for the experiment, the Ministry only use soil with up to 3,000 becquerels per kilogram.
As a result, the officials are unable to test whether soil with higher levels of contamination is safe for recycling.

The project also raises **questions about the long-term monitoring of public works built with contaminated soil,** and how the Ministry will win the support of people who live nearby.

May 18, 2017

Plan would reuse contaminated soil (NHK video)

https://www3.nhk.or.jp/nhkworld/en/news/videos/20170518173239108/

May 28, 2017

Dry cask storage

Fukui town mayor floats idea of dry cask storage for nuclear fuel

https://mainichi.jp/english/articles/20170528/p2g/00m/0dm/052000c

FUKUI, Japan (Kyodo) -- The mayor of a Fukui Prefecture town hosting a Kansai Electric Power Co. nuclear power plant where one of its reactors resumed operations just this month has floated the idea of installing dry cask storage within the plant and keeping ever increasing spent fuel there.
Takahama Mayor Yutaka Nose's idea, though floated only as an option, is a rare one coming from someone in his position given that nuclear fuel is supposed to be moved out of a power station after it reaches the end of its usefulness after generating electricity.
At the same time, Nose has called for the central government's greater involvement in projects to build temporary storage facilities for spent nuclear fuel outside nuclear power plants.
While Kansai Electric has said the site for its temporary storage facility to be built outside Fukui would be finalized sometime around 2020 and that the facility would begin being used around 2030, "there is no guarantee that (a municipality) outside the prefecture would agree to host the facility," Nose said in a recent interview with Kyodo News.
But "it'll be too late if we start thinking about (what to do with spent fuel) after (spent fuel pools) become full. We need to have a backup plan in case (the temporary storage project) goes nowhere," he said.
Nose has effectively floated the option of building dry cask storage within the Takahama plant and keeping spent fuel there while at the same time continuing to use existing fuel cooling pools at reactors.
Dry cask storage, where spent fuel is kept in metal containers, "will reduce risks" of accidents, Nose said, on the grounds that such a storage method does not need water or electricity to keep spent fuel cooled.

In the 2011 Fukushima nuclear disaster triggered by a powerful earthquake and tsunami, reactors temporarily lost cooling functions in their spent fuel pools, putting a massive amount of fuel at risk of overheating and exposure.
"I'm responsible for the lives of town residents. Even if it is impossible to attain 100 percent safety, it is natural that we think about reducing risks. Not that we want to actively seek (spent fuel), but we have to think about the reality that (spent fuel) would remain in Takahama town," he said.
The No. 4 reactor at the four-reactor Takahama plant resumed operations on May 17 amid persistent public concerns over the safety of nuclear power following the 2011 nuclear crisis. The plant's No. 3 unit is scheduled to go back online in early June, while the remaining two units are expected to remain offline for the foreseeable future.
Cooling pools at the plant are capable of storing a total of 4,400 fuel assemblies but must be kept at less than capacity to allow for fuel exchange work. The pools collectively have about 2,700 assemblies already. If all four reactors begin operating there, the pools will reach their capacity within six to seven years.

Nuclear fuel storage: A pipe dream?

An official from the Agency for Natural Resources and the Nuclear Waste Management Organization of Japan shows a model of a proposed underground burial facility for nuclear waste during a town hall meeting in Toyama on May 20. | ERIC JOHNSTON

Nuclear storage crisis grows as reactor restarts continue

http://www.japantimes.co.jp/news/2017/05/28/national/nuclear-storage-crisis-grows-reactor-restarts-continue/#.WSqp89ykKic

by Eric Johnston

Staff Writer

TOYAMA – More than six years after the March 11, 2011, Tohoku quake, tsunami, and triple meltdown at the Fukushima No. 1 nuclear power plant, Japan is accelerating efforts to restart as many reactors as it possibly can. Four have been revived so far, and Kansai Electric Power Co. plans to restart the Takahama No. 3 unit soon.

But the rush to restart them has only highlighted the fact that Japan still has no final repository for its high-level radioactive waste. Original plans to first reprocess spent fuel at the Rokkasho facility in Aomori Prefecture before final disposal somewhere else have long been stalled. After 17 years asking prefectures and municipalities around the country to host such a site, no takers have been found.

So the government has changed its approach, saying it will draw up a map by this summer of "scientifically appropriate" candidate sites around the country.

To explain what that means, a series of town hall meetings are taking place at select locations this month and next month.

On May 20, officials from the Agency for Natural Resources and the Nuclear Waste Management Organization of Japan (NUMO) were in Toyama, which is less than 50 km from the Shika nuclear power plant in neighboring Ishikawa Prefecture.

At present, there are about 18,000 tons of spent nuclear fuel stored in about 40,000 canisters at Japan's nuclear power plants, said NUMO Executive Director Shinichi Ito. A final disposal site for high-level waste produced when, or if, the fuel is reprocessed would need to be quite large. Most of it would be underground, with an elaborate tunnel system of transport vehicles to deliver and store the waste.

"In terms of scale, above-ground facilities at a final depository would be between 1 to 2 sq. km, and the underground portion would be 6 to 10 sq. km in area, located at a depth of more than 300 meters from the surface. There would be some 200 km of tunnels in total for the storage facilities," Ito said.

Waste would be stored at the site for around a half century. The basic cost for building a final depository is ¥3.7 trillion.

In drawing up the map of what constitutes a scientifically appropriate site, the government has a list of conditions and standards based on what it does not want.

A site should not be built within a 15-km radius of a volcano, and not near active fault lines at least 10 km long. In addition, it should not be situated in area where there is a lot of geothermal activity.

The government is also seeking a site that is within 20 km of a port where ships carrying the waste could dock, since transporting waste by ship, the government says, is the most appropriate method.

Iwao Miyamoto, director of the public relations office of the Agency for Natural Resources' Radioactive Waste Management Office, said that, after the map is publicized and dialogue takes place with authorities deemed to have appropriate sites, a three-stage survey process would be carried out.

"The first stage would be to research the seismological and geological history of a potential site, checking to see how frequently earthquakes and volcanoes in and around the area have occurred," Miyamoto said. "The second stage would be on-site drilling to determine how porous the rock bed is, and the third step is a precision survey to determine if the site can handle an underground storage facility.

"The first survey stage is expected to take two years, the second stage four years, and the final stage around 14 years," he added.

In an attempt to entice the authorities at a chosen site, the central government will offer funding and economic incentives that the municipalities hosting nuclear power plants have long enjoyed.

"NUMO will work with a government that accepts a final storage facility to renovate and expand its roads, ports, and information systems," Ito said. "There will also be donations for revitalizing the local economy via support for locally produced goods and for local culture."

However, overcoming local political resistance in an area judged appropriate for a final depository is likely to be a long, difficult road. Nobody wants to be known as the town or village with a nuclear waste dump, and questions remain about the safety of transporting toxic waste by land or by sea.

Some governors in prefectures with many reactors have made it clear they will oppose any effort by the central government or utilities to bury nuclear waste on site or beside the plant that generated it.

"Fukui has accepted nuclear power plants. But it has no obligation to accept final disposal of nuclear waste," Fukui Gov. Issei Nishikawa said in 2015. Fukui is home to 13 commercial reactors.
"We have our hands full just dealing with the nuclear reactors we have now," Saga Gov. Yoshinori Yamaguchi said last year, indicating his prefecture would not accept being the site of a final repository. Saga hosts the four reactors at the Genkai plant run by Kyushu Electric. Yamaguchi approved the restart of Genkai units 3 and 4 in April.
Once the map is published, it is sure to galvanize opinion in those places judged appropriate and become a politically delicate topic. Yet with Agency for Natural Resources estimates showing the spent fuel pools of 17 power plants will run out of space within the next 15 years, if run continuously, the problem of final disposal grows more acute with each passing day. Pressure on those areas that fit the requirements for final disposal is likely to be intense.
At this point, though, the central government says that if a local government with a site deemed appropriate by the map still refuses once the survey begins, that will be the end of it.
"If there is official opposition at the local level at any stage of a survey, there would be no advancement to the next stage," Miyamoto said.
However, given all of the problems Japan has had trying to make its reprocessing program work, critics say that attempting to draw up a plan for a final repository is a pipe dream.
" The Japanese government knows the current final nuclear waste repository program will never materialize. The whole project depends upon the creation of high-level waste canisters, i.e. the reprocessing of spent nuclear fuel. But t he program also depends on Japan recovering and consuming tons and tons of plutonium
" The Rokkasho reprocessing plant's commercial operation has been delayed 23 times, and the fast reactor program to consume the plutonium is at square one despite over a half century of effort," said Aileen Mioko Smith of Kyoto-based Green Action.

June 27, 2017

Dumping nuclear waste directly into Pacific Ocean

Japan To Dump Deadly Fukushima Nuclear Waste Into Pacific Ocean

http://yournewswire.com/japan-fukushima-nuclear-waste-dump-ocean/

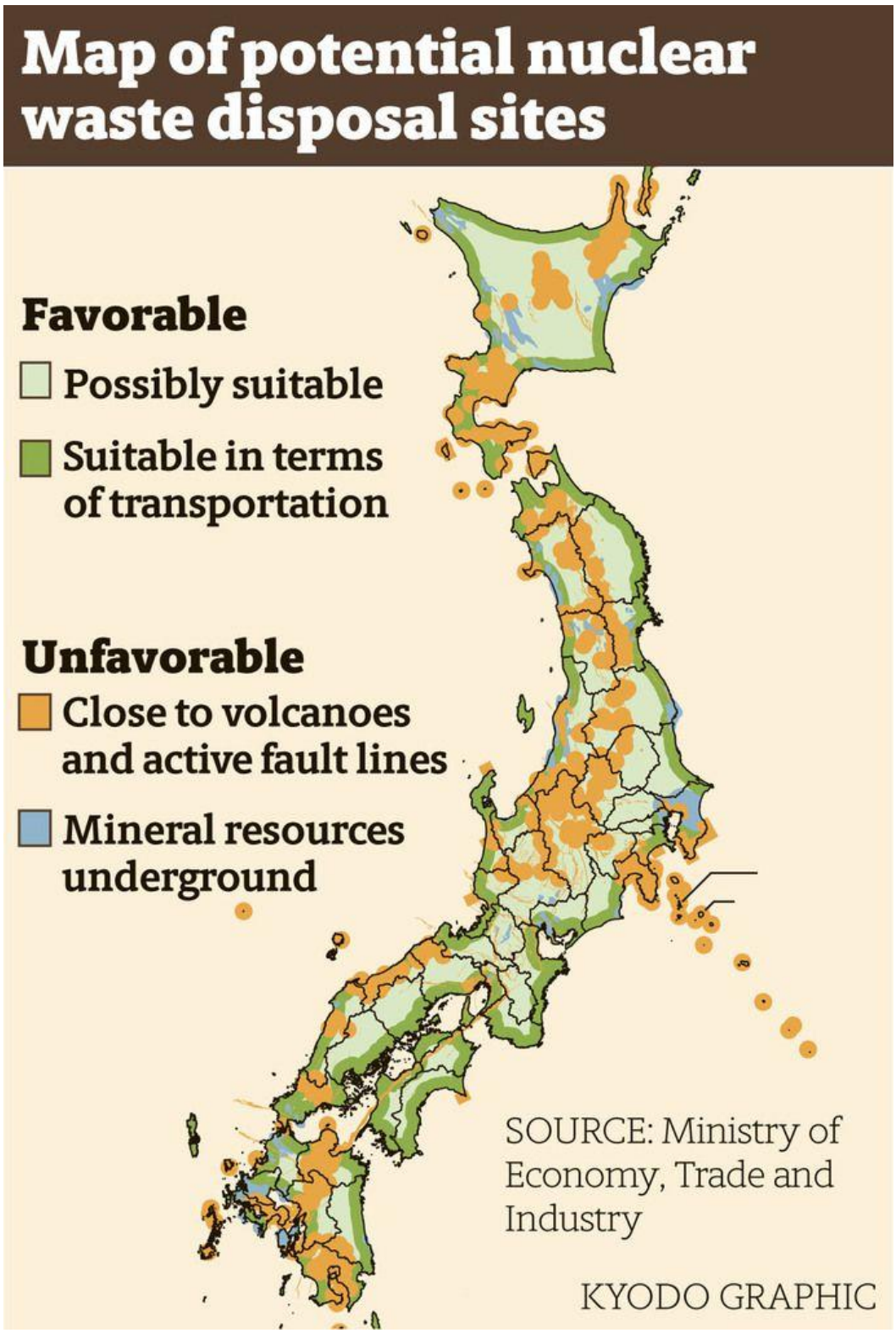
Japan has announced plans to dump 920,000 tons of deadly Fukushima nuclear waste into the Pacific ocean, saying that they can no longer contain the waste on land.
Following the major tsunami in 2011 that resulted the reactors at the Fukushima Daiichi Nuclear Power Plant shutting down, the constant leaking of radiation that has occurred in the aftermath has been dubbed one of the worst nuclear disasters since Chernobyl.
Newstarget.com reports: Six years after the disaster, the three crippled reactors are still leaking water with high levels of radiation into the Pacific Ocean. Though the Pacific Ocean is a vast stretch of water, Fukushima's radiation is reaching the coast of the United States, Canada, and Mexico, contaminating the fish we eat and the water we swim in.
While these findings were first considered "fake news" and laughed away, researchers can no longer deny that Cesium-134, the so-called fingerprint of Fukushima, has been found in seawater and fish along the Western Coast of the Americas.
In TRT's daily news show "Insight," hosted by former Sky News presenter Martin Stanford, the head of international atomic energy agency has called on the world to help with the cleanup of the Fukushima site.

Japan fails to clean up the mess, plotting to discharge nuclear waste into the ocean
Ever since the tsunami put the Fukushima plant out of business, one of the ongoing core tasks has been to cool the reactors and prevent the release of highly contaminated water leaking from the three units. Though it has been six years since the disaster, the cleanup is making slow progress.

Mark Whitby, chairman and design director of the engineering and consultancy firm WME Consultants, explained that today about 400 tons of water go into each reactor to cool it. Part of the highly radioactive water is recycled to re-cool the reactors, and the rest goes into big tanks, which are stacking up at a fast rate. As reported by TRT, Japan is running out of storage space. There are currently about a 1,000 storage tanks holding 920,000 tons of contaminated water.
As if the marine life isn't struggling enough already by the vast amounts of plastic in the oceans, the Japanese are now talking about dumping these tanks with nuclear wastewater directly into the sea because they cannot keep building and storing these reservoirs, Whitby told TRT.
Also, to this day researchers are uncertain whether the melted cores are still within the containment structures or if they have burrowed through the vessels, contaminating the groundwater that ends up in the Pacific Ocean. Since many robots, sent out to assess the damage, have been destroyed due to the high levels of radiation that melts their electronics, it is tough to get this information.
Recently, however, one camera lasted long enough to show that molten core debris has burned through the bottom of the inner reactor wall. The radioactive debris is now burrowed deep into the foundations of the reactor, causing the highest radiation levels measured around the reactor since the triple core meltdown six years ago. Until these cores can be retrieved, the reactors will keep leaking radioactive material into the groundwater.
According to Japan's former prime minister, the current Prime Minister Shinzo Abe is lying about the situation being under control. Abe has also been criticized for forcing more than 6,000 people to return to their home in areas that are still highly contaminated zones.
According to the Japanese government, Japan will be safe by 2020. Therefore, it will hold the Olympic baseball and softball in the Fukushima area to show "Japan is cool," even if their reactors are still posing a serious threat.
For more info watch the full Insight episode below.
https://youtu.be/hMr3pBAPgLg?t=8
https://youtu.be/hMr3pBAPgLg

July 28, 2017

Map of "suitable" nuke storage sites (1)



METI maps out suitable nuclear waste disposal sites

http://www.japantimes.co.jp/news/2017/07/28/national/meti-posts-map-potential-nuclear-waste-disposal-sites/#.WXuNhVFpyot

Kyodo

The government on Friday unveiled a nationwide map of potential disposal sites for high-level nuclear waste that identifies coastal areas as “favorable” and those near active faults as unsuitable.
But the process promises to be both difficult and complicated as public concern lingers over the safety of nuclear power since the triple core meltdown in Fukushima Prefecture in March 2011.
The map, illustrated in four colors indicating the suitability of geological conditions, was posted on the website of the Ministry of Economy, Trade and Industry.
Energy minister Hiroshige Seko said earlier Friday that the unveiling of the map is an “important step toward bringing about final disposal sites, but also the first step on a long road.”
“We hope to communicate (with municipalities) nationwide and win over the public,” he said.
“The map is not something with which we will seek municipalities’ decisions on whether to accept a disposal site,” Seko said.
To permanently dispose of high-level nuclear waste, it must be stored at a repository more than 300 meters underground so it cannot harm human life or the environment.
The map identifies about 70 percent of Japan as suitable for hosting nuclear dumps. Up to 900 municipalities, or half of the nation’s total, encompass coastal areas deemed favorable for permanent waste storage.
Areas near active faults, volcanoes and oil fields, which are potential drilling sites, are deemed unsuitable because of “presumed unfavorable characteristics,” and hence colored in orange and silver on the map.
The other areas are classified as possessing “relatively high potential” and colored in light green.
Among the potential areas, zones that are within 20 km (12 miles) of the coastline are deemed especially favorable in terms of waste transportation and colored in green. The ministry formulated the classification standards in April.
Parts of giant Fukushima Prefecture, where decontamination and recovery efforts remain underway from the mega-quake, tsunami and triple core meltdown of March 2011, are also suitable, according to the map. But Seko said the government has no plans at this stage to impose an additional burden on the prefecture.
Seko also signaled that Aomori Prefecture, which hosts a nuclear fuel reprocessing facility, is exempt from the hunt because the prefectural government and the state have agreed not to build a nuclear waste disposal facility there.
Japan, like many other countries with nuclear power plants, is struggling to find a permanent geological site suitable for hosting a disposal repository. Finland and Sweden are the only countries worldwide to have picked final disposal sites.

Govt. compiles map of possible nuclear waste sites

https://www3.nhk.or.jp/nhkworld/en/news/20170728_28/

Japan's industry ministry has released its first map of potentially suitable sites for an underground repository that will hold highly radioactive nuclear waste.

The government plans to build a 300-meter-deep facility to permanently dispose of the waste, which is created when spent fuel from nuclear power stations is reprocessed.

The map released on Friday shows areas across Japan in 4 colors, according to their suitability.

Areas judged to be relatively favorable make up about two-thirds of all land in the country.

Regions within 20 kilometers of the coastline are shown in deep green, meaning they are most appropriate, as it will be easier to reach them when transporting nuclear waste by sea. They cover about 900 municipalities. Other favorable areas are shown in light green.

Land near volcanoes and active faults, and land with soft ground, is shown in orange. Places with oil and natural gas deposits are colored in silver. Both colors are deemed unfavorable.

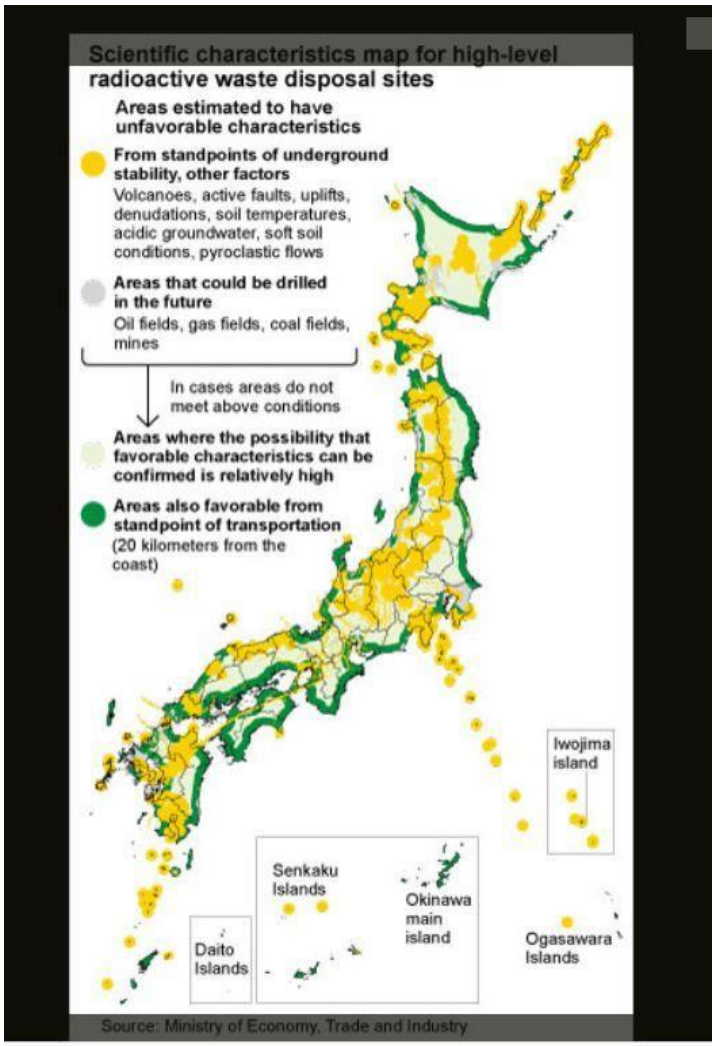
The ministry says the map is the first step in the process of choosing a location, but it is not designed to force municipalities to submit to feasibility studies.

Ministry officials plan to hold briefings nationwide in a bid to win support from the public. No local authorities have agreed to a feasibility study.

The government says it will give special consideration to Aomori and Fukushima prefectures when making its decision. Aomori already has an intermediate storage facility for spent fuel, and Fukushima is still recovering from the 2011 nuclear accident.

July 29, 2017

Map of "suitable" nuke storage sites (2)



Japan maps areas suitable for final disposal of nuclear waste

http://www.asahi.com/ajw/articles/AJ201707290027.html

By MASANOBU HIGASHIYAMA/ Staff Writer

The economy ministry estimates that about 30 percent of the Japanese archipelago is suitable on scientific grounds for the final disposal of high-level radioactive waste for at least 100,000 years.

It released a "**scientific characteristics map**" July 28 that indicates areas regarded as favorable from the standpoints of geological conditions and transportation.

If any municipalities show interest in offering land for the long-term disposal, the Ministry of Economy, Trade and Industry (METI) plans to request that they allow detailed surveys to go ahead.

"The release of this map is an important step to realize final disposal (of high-level radioactive waste). It is the first step on the long road," economy minister Hiroshige Seko said in a news conference held after a Cabinet meeting on July 28.

High-level radioactive waste is generated from spent fuel produced at nuclear power plants. The spent fuel has to be mixed with glass and vitrified before it is buried more than 300 meters underground.

Storage conditions will have to endure for at least 100,000 years until radioactivity falls to levels that will not impact the land surface, even if the glass and containers melt in several tens of thousands of years.

Thus, the ministry is interested in areas where changes in the groundwater and soil conditions are minimal.

The map does not pinpoint potential nuclear waste repository sites, but classifies the Japanese archipelago into four color-coded categories based on factors such as active faults, volcanoes and soil conditions that are already in the public domain.

Areas deemed unfavorable from the standpoint of underground stability and other factors are depicted in orange. Areas that fall into this category include those that lie within a radius of 15 kilometers from volcanoes or are located close to active faults.

Areas with reserves of oil, natural gas, coal and other minerals that could be drilled in the future are shown in silver.

Areas deemed suitable as final disposal sites are shown in green, and if they lie within 20 km of the coastline they are shown in dark green to signify that they are also favorable from the standpoint of transportation by ship.

Municipalities with dark green areas number about 900, more than half of all municipalities in Japan. **Some of the 900 municipalities are located in Tokyo and Kanagawa, Aichi and Osaka prefectures that have sprawling cities.**

From autumn this year, the economy ministry plans to hold discussions with municipalities that include dark green areas to explain about the necessity of pinning down final disposal sites and the risks of storage over tens of thousands of years.

It hopes to narrow down the candidate sites in about 20 years.

The Nuclear Waste Management Organization of Japan (NUMO) began asking municipalities from 2002 about offering themselves as candidate sites for surveys. At that time, Toyo in Kochi Prefecture applied for the survey. Later, however, it withdrew the application because of opposition from local residents.

August 12, 2017

Nuclear waste disposal

This 2013 file photo shows radioactive waste sealed in large stainless steel canisters under a five-feet of concrete in a controversial storage facility near Aiken, South Carolina. The Ministry of Economy, Trade and Industry has plans to dispose of Japan's nuclear waste using similar means. | AP

NATIONAL / MEDIA | MEDIA MIX

METI seeks to pass nuclear buck with release of waste disposal map

http://www.japantimes.co.jp/news/2017/08/12/national/media-national/meti-seeks-pass-nuclear-buck-release-waste-disposal-map/#.WZAAq8Zpyic

by Philip Brasor

Taro Kono's appointment as the new foreign minister is raising eyebrows. Though he hasn't shown any indication that he will buck Prime Minister Shinzo Abe's agenda, Kono is considered a leftish maverick within the Liberal Democratic Party, especially with regard to its nuclear energy policy, which he has opposed. In an editorial, the conservative Sankei Shimbun insisted he maintain the LDP line when the 30-year U.S.-Japan nuclear energy pact expires next year.

The pact's ostensible purpose is to authorize the reprocessing of spent nuclear fuel for energy purposes so as to limit the amount of weapons-grade plutonium Japan can stockpile. This system has been stymied, however, by the decommissioning of the experimental Monju fast-breeder reactor and the shutdown of most of the nation's nuclear plants following the Fukushima No. 1 meltdowns in 2011. Whatever reprocessing of spent fuel that has been done has been carried out in the U.K. and France and, of the 47 tons of extracted plutonium possessed by Japan, 36 tons are still overseas.

So the U.S. has no reason to worry about the prospect of Japan suddenly turning plutonium into bombs. Japan's "peaceful" use of atomic energy, after all, was encouraged by America in the 1950s, when the horrors of Hiroshima and Nagasaki were still fresh in people's minds.

But Japan's long-term plan of recycling spent fuel into plutonium fuel has hit a wall, not only because of Monju's failure, but also because of the continued postponement of the opening of the reprocessing plant in Rokkasho, Aomori Prefecture.

Nevertheless, two weeks ago, the Ministry of Economy, Trade and Industry (METI) published a map showing plans for disposing of the high-level waste that's a byproduct of processing. The map illustrates possible candidate areas for waste disposal. "Suitability" is indicated by color, with green being the most suitable and orange unsuitable due to geological phenomena such as earthquake faults, volcanoes and ground water movement. The green areas are mainly on the coastline because ships will

likely be used to transport the waste. Silver is used for areas not being considered because they may contain deposits of minerals that can still be exploited.
The map was drawn up so that the public would know the government still takes its nuclear energy program, as well as the stalled recycling plan, seriously, and most media outlets have conveyed those points. However, NHK has looked at the map and wondered if it has any real meaning. As the public broadcaster pointed out on its "Jiron Koron" explanation series, the waste will be kept underground for up to 100,000 years, buried 3 kilometers deep at the bottom of a series of deep tunnels.
Consequently, getting local governments to offer land for disposal sites is going to be very difficult. METI insists that participation is voluntary and has sent requests to 1,750 municipalities, but given the public's allergy to nuclear power in the wake of Fukushima, NHK doesn't seem to think anyone is going to raise their hand, even though acceptance comes with rewards: ¥2 billion for the initial two-year data study and ¥7 billion for the followup on-site study. After accepting those two deliveries of cash, a local government could still reject METI's request. And even if it grants METI's request, landowners will later have to be consulted and paid. At present the cost of disposal is estimated at ¥3.7 trillion, but it is sure to go up.
The plan is actually an old one, developed as part of the scheme to recycle spent fuel, a process that produces its own particular waste that is much more radioactive than the spent fuel itself. This waste is combined with molten glass and poured into steel canisters, which are eventually buried underground. According to international law, such waste is the responsibility of the country that owns the original fuel and cannot be exported for disposal.
Because of the delay with Rokkasho, Japan has had the U.K. and France do their recycling, and the waste has been shipped back to Japan along with the recycled fuel. It's now sitting at the Rokkasho plant in refrigerated containers.
There is also a lot of spent fuel at Rokkasho waiting to be reprocessed, and the governor of Aomori, frustrated by the government's equivocation, has been threatening to send it back to the reactors from whence it came if the plant isn't opened for business. There are presently 18,000 tons of spent fuel in storage at the plants that produced it and there is no room left for any more.
The disposal plan is only theoretical as long as Rokkasho remains inoperable and fuel reprocessing delayed. Moreover, there has been no public discussion about what happens to all the spent fuel if reprocessing is abandoned, though there are media reports of a "feasibility study."
NHK predicts "confusion." The green areas will be studied for 20 years before their suitability is confirmed. Building tunnels will take at least another 30. By the time a disposal plan is achieved, present METI bureaucrats, not to mention the current captains of the nuclear power industry, will be deader than the waste they're trying to get rid of. What the map actually represents is METI pushing the problem on to the next generation as nuclear reactors — if they are restarted as planned — continue to produce even more.
On July 29, the Tokyo Shimbun commented that the map does nothing to gain the public's understanding, but perhaps the government is not yet that desperate. During a recent discussion on Bunka Hoso's "Golden Radio" program, economist Takuro Morinaga said, "METI doesn't seem to be in a hurry," because it is counting on the failing finances of rural areas to persuade local governments to take its money in return for disposal sites.
"**The best idea would be not to make any more waste,**" added Morinaga, hinting at an alternative to the LDP's pro-nuclear policy. "But that's not how the government thinks."

October 25, 2017

Storage site starting operation on Oct.28

An intermediate storage facility under construction in Okuma, Fukushima Prefecture, in February, with the Fukushima No. 1 nuclear plant in the background (Asahi Shimbun file photo)

Fukushima debris heading to intermediate storage facility

http://www.asahi.com/ajw/articles/AJ201710250040.html

The Environment Ministry on Oct. 28 will start bringing radiation-contaminated soil to an intermediate storage site in Fukushima Prefecture, despite having acquired less than half of the land needed for the overall project.

The ministry's announcement on Oct. 24 marks a long-delayed step toward clearing temporary sites that were set up around the prefecture to store countless bags of radioactive debris gathered after the triple meltdown at the Fukushima No. 1 nuclear power plant in March 2011.

The entire intermediate storage project will cover a 16-square-kilometer area spanning the towns of Futaba and Okuma around the nuclear plant. It is designed to hold up to 22 million cubic meters of contaminated debris for a maximum period of 30 years.

However, the ministry is still negotiating with landowners on buying parcels of land within the area. As of the end of September, the ministry had reached acquisition agreements for only about 40 percent of the land for the project.

The soil storage facility that will open on Oct. 28 is located on the Okuma side. It has a capacity of about 50,000 cubic meters.

Bags of contaminated soil stored in Okuma will be transferred to the facility, where the debris will be separated based on radiation dosages.

A similar storage facility is being constructed on the Futaba side.

The ministry initially planned to start full-scale operations of the entire storage facility in January 2015. However, it took longer than expected to gain a consensus from local residents and acquire land at the proposed site.

In March 2015, a portion of the contaminated soil was brought to the Okuma facility for temporary storage.

Interim storage site for Fukushima contaminated soil to begin full operations

https://mainichi.jp/english/articles/20171025/p2a/00m/0sp/012000c

An interim storage site in Fukushima Prefecture for soil and waste generated when areas affected by the Fukushima nuclear crisis were decontaminated will be put into full-scale operation on Oct. 28, Environment Minister Masaharu Nakagawa said.

- 【Related】Decontamination work in Fukushima Pref. far from finished business
- 【Related】3 nabbed over alleged illicit job mediation for Fukushima cleanup workers
- 【Related】Fukushima mulls criminal complaint over fake forest decontamination work

Contaminated soil temporarily placed on the premises of the facility, which straddles the prefectural towns of Okuma and Futaba, will be brought into an underground storage site on the property.
The storage site will be the first one in the country to be put into full-scale operation to store contaminated soil and other waste.
"There are numerous challenges that must be overcome, but the start of operations at the facility is an important step toward the final disposal of contaminated soil," Nakagawa told a news conference on Oct. 24.
The Environment Ministry is constructing the interim storage site on an approximately 16-square-kilometer area around the disaster-stricken Fukushima No. 1 Nuclear Power Plant.
Operations at a section of the facility located in Okuma will begin on Oct. 28. After contaminated soil is measured for radiation, the soil will be stored separately at the facility depending on levels of radiation.
Waterproof work has been performed at the site to prevent stored soil from contaminating ground water.
At the site, a plant to incinerate weeds, trees and other flammable materials removed from contaminated soil and a facility to manage incinerated ash containing high levels of radioactive cesium will also be built.
The ministry estimates that the amount of soil and other waste removed from decontaminated sites in the prefecture could reach up to some 22 million cubic meters.
Decontamination work is still going on in some areas affected by the nuclear disaster, which broke out in March 2011 following the Great East Japan Earthquake and tsunami.
Most of the soil removed from decontaminated areas was put into bags and temporarily stored at various locations in Fukushima Prefecture. Some of the bags have been brought onto the premises for the interim storage site since March 2015.
The central government intends to build a final disposal site outside the prefecture to complete the disposal of contaminated soil by 2045. However, the government has not worked out a specific plan on the final disposal site, such as its location and the timing of its construction.

November 17, 2017

Disposal waste starts in Fukushima

Disposal of radioactive waste begins in Fukushima

https://www3.nhk.or.jp/nhkworld/en/news/20171117_27/

The first batch of radioactive waste from the 2011 nuclear accident has arrived at a final disposal site in Fukushima Prefecture.

Containers filled with radioactive ash were delivered by trucks to the facility in Tomioka Town on Friday and placed on the site with cranes. The ash consists of incinerated debris and other waste produced near the Fukushima Daiichi nuclear plant.

The disposal site accepts waste with radioactive concentrations of between 8,000 and 100,000 becquerels per kilogram.

The Environment Ministry plans to place the ash in special containers or pack them in cement. It will monitor groundwater and nearby rivers for possible contamination.

The facility in Fukushima is the only place where final disposal of contaminated materials is possible.

Persistent local opposition has prevented other prefectures from designating their dump sites.

A ministry official says the ministry will continue efforts to seek residents' understanding for the project.

November 27, 2017

Disposing of nuclear waste, but where?

EDITORIAL: Public hearings on nuclear waste need rethink to dispel distrust

http://www.asahi.com/ajw/articles/AJ201711270021.html

Selecting the site and method for the final disposal of high-level radioactive waste, which is derived from spent fuel from nuclear power reactors, represents a major conundrum.
The government's public hearings on the issue should be fundamentally revamped to enable substantial discussions on a national level.
The Agency for Natural Resources and Energy and the Nuclear Waste Management Organization of Japan (NUMO) have been holding explanatory meetings on the matter, prefecture by prefecture, since October.
It was learned recently that students who attended those meetings had been offered remuneration in cash and other items for their attendance.
The finding concerns a total of 39 participants at five venues, including in Tokyo and Saitama Prefecture.
Officials said a contractor commissioned with public relations for young audiences made the offer at its own discretion, which had no impact on the course of discussions at the meetings. But such a practice could hurt the fairness and trustworthiness of those public hearings.
NUMO has rightly opened investigations into the past practices and begun weighing measures to prevent a recurrence.
At the same time, the organizers should also face up squarely to other problems that have emerged during the meetings that have been held to date.
Each explanatory meeting is made up of two sessions.
The first session is centered, among other things, on a presentation of the government's Nationwide Map of Scientific Features for Geological Disposal, which shows which parts of Japan are eligible for being candidate final disposal sites.
The participants split into smaller groups to exchange views during the second session.

At most of the venues, the meeting turnout has failed to reach the maximum capacity of 100 participants. The turnout has been particularly poor during the second sessions, with only about 20 to 30 people attending.
The public hearings are being held on weekday afternoons for reasons of availability for the organizers. That is apparently making it difficult for working citizens to attend.
The organizers say they plan to cover all prefectures of Japan, except Fukushima Prefecture, during a six-month period. Holding the meetings in line with that predetermined timetable may have become an end in itself.
The contractor, on its part, mobilized the students perhaps because in surmising the organizers' intent, it believed that small audiences, particularly with youths underrepresented, did not make for a good image.
Needless to say, the public hearings are not being held just to denote that they have been held. They are being organized to help the issues of spent nuclear fuel shared on a national level and enable substantial discussions on them.
One participant at the Tokyo venue said that a video screened at the opening of the meeting was "inappropriate" because it presented the nuclear fuel recycling program, which is about extracting and reusing plutonium and uranium from reprocessed spent fuel, in a way that could be taken to imply as if the procedure had been established.
The nuclear fuel recycling program has evidently failed, as symbolized by the recent decision to decommission the Monju fast-breeder reactor. Direct disposal of nuclear waste, in which spent fuel is buried without being reprocessed, has become the mainstream method in countries other than Japan, not the least in Finland, where a final disposal site has been selected.
The government and NUMO should convey information that may be inconvenient to them in lending their ears to a broad spectrum of opinions.
As long as they stick to a stance of only allowing discussions premised on the continuation of the current nuclear power policy, that would only intensify distrust among the public and would do little in the way of gaining broader understanding toward the selection of a final disposal site.

February 8, 2018

New on-site storage facility for radioactive rubble

Rubble storage at Fukushima plant shown to media

https://www3.nhk.or.jp/nhkworld/en/news/20180208_32/

The operator of the Fukushima Daiichi nuclear plant has completed a facility to store radioactive rubble from the March 2011 accident.

Tokyo Electric Power Company showed the new storage facility in the compound to the media on Thursday.

The Number 1 to Number 3 reactors suffered meltdowns and the reactor buildings were badly damaged after a quake-triggered tsunami hit the plant on March 11th, 2011.

As part of decommissioning work, rubble scattered after the accident needs to be cleared before spent nuclear fuel can be removed from storage pools in the upper parts of the reactor buildings.

At the Number 1 reactor building, work to clear more than 1,500 tons of rubble began in January. Its

pool stores 392 fuel units.

The newly-completed facility is capable of storing more than 60,000 cubic meters of rubble.

Officials say a special vehicle that blocks radiation will take rubble from the Number 1 reactor building to the storage facility, and remote-controlled forklifts will be used to carry the rubble inside it.

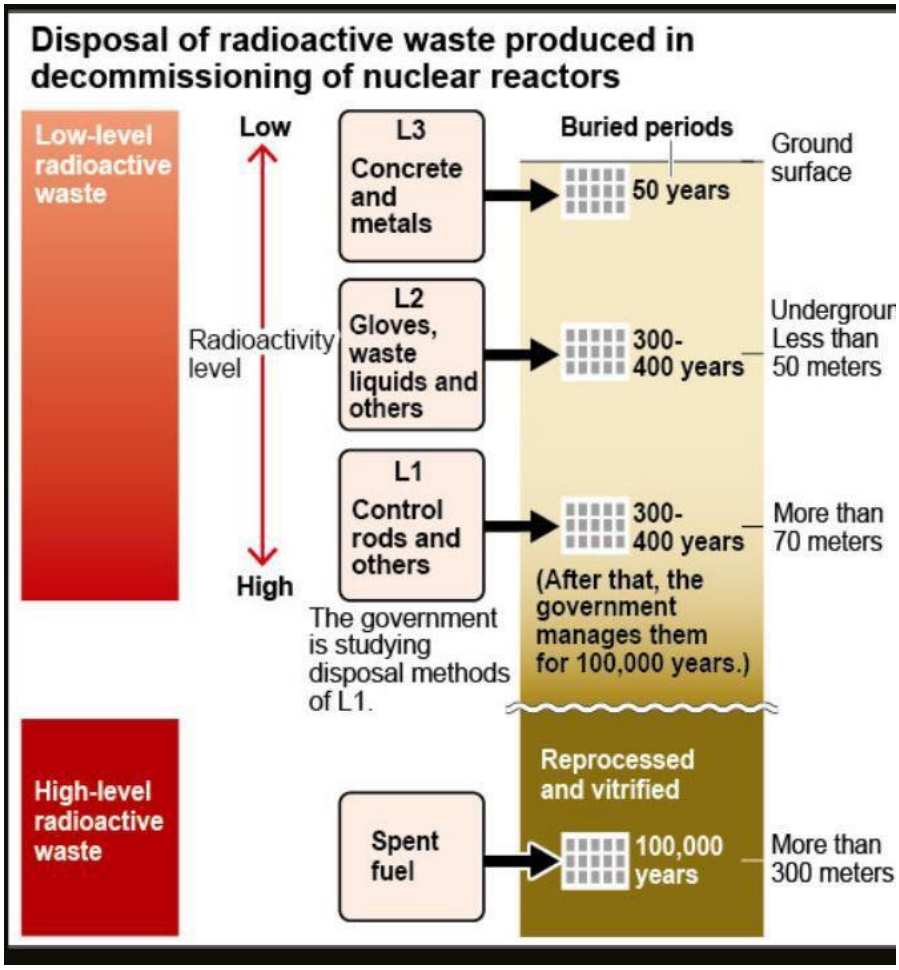
The storage facility is 2 stories above ground and 2 below. The more radioactive the debris, the deeper underground it will be stored.

Officials say **the facility can block radiation of levels up to 10 sieverts per hour, as it is covered by concrete walls up to 65 centimeters thick.**

Kazuteru Ofuchi, a TEPCO official in charge of waste disposal, says the firm will make sure to minimize workers' exposure to radiation, by working remotely.

February 16, 2018

No utility has any idea how to safely dispose of low-level waste



All utilities lack disposal sites for low-level waste from reactors

By TSUNEO SASAI/ Staff Writer

Seven electric power companies that plan to decommission nuclear reactors have yet to secure disposal sites for the low-level radioactive waste produced in the dismantling process, an Asahi Shimbun survey showed on Feb. 16.

It may take years for the utilities to gain approval from local governments to dispose of the waste, some of which must remain buried for 100,000 years, meaning that the decommissioning work could be suspended.

Low-level radioactive waste generated during conventional operations of nuclear reactors can be buried at a disposal site of Japan Nuclear Fuel Ltd. in Rokkasho, Aomori Prefecture.

However, the electric power companies themselves must dispose of the low-level radioactive waste produced during decommissioning work.

The Asahi Shimbun asked 10 electric power companies, including Japan Atomic Power Co., about whether they have secured disposal sites for low-level radioactive waste.

Seven companies--Tokyo Electric Power Co., Chubu Electric Power Co., Kansai Electric Power Co., Chugoku Electric Power Co., Shikoku Electric Power Co., Kyushu Electric Power Co. and Japan Atomic Power--replied that they have not secured sites despite their plans to decommission reactors.

In total, they plan to decommission 17 reactors.

The demolition of a 1.1 gigawatt-class nuclear reactor produces more than 10,000 tons of low-level radioactive waste.

The three other companies--Hokkaido Electric Power Co., Tohoku Electric Power Co. and Hokuriku Electric Power Co.--also have not secured disposal sites, but they have no decommissioning plans at the moment.

“We are not considering decommissioning our nuclear reactors,” a Hokuriku Electric Power official said. “As of now, we have not yet decided on a plan to secure disposal sites.”

There are three categories of nuclear waste--L1, L2 and L3--depending on their radioactivity levels.

L1 waste, which has the highest radioactivity level and includes control rods, must be buried more than 70 meters deep into the ground for 300 to 400 years.

After that, the government manages the waste for 100,000 years.

The government is currently studying regulation standards for such waste.

Electric power companies decided to decommission some of their nuclear reactors after the March 2011 disaster unfolded at the Fukushima No. 1 nuclear power plant.

Full-fledged decommissioning work is expected to start soon, but parts removed from the reactors have high radiation levels and cannot be placed temporarily in the compounds of nuclear power plants.

High-level radioactive waste is also produced as a result of the reprocessing of spent nuclear fuel. The government is looking for a disposal site for such waste.

Electric power companies could heighten their demands that the government get involved in efforts to secure disposal sites for low-level radioactive waste.

February 21, 2018

Sessions on nuke waste have resumed

Briefing sessions on nuclear waste resumed

https://www3.nhk.or.jp/nhkworld/en/news/20180221_29/

Briefing sessions on nuclear waste disposal sites have been resumed on a trial basis after a lapse because they were held in an inappropriate manner.

The Japanese government has been working to find underground disposal sites to deal with radioactive waste from nuclear plants.

The Nuclear Waste Management Organization, or NUMO, stopped holding briefing sessions in December. This came after a firm commissioned to organize those events was found to have mobilized college students with the promise of a reward.

NUMO says that in principle it will not entrust other parties to organize the sessions.

And it held a session in Tokyo on Wednesday on a trial basis. Thirty-seven people took part. At the beginning, NUMO officials apologized for the mishandling.

An official from the government then showed a nation-wide map putting forward areas that could be surveyed to find disposal sites.

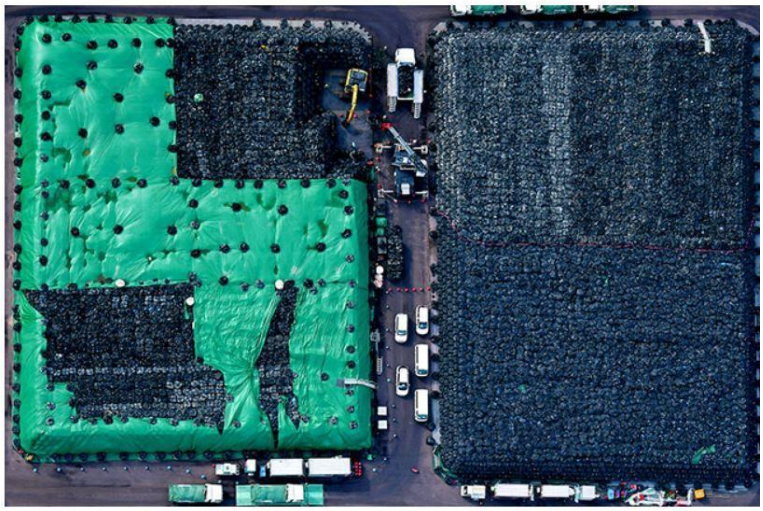
But some participants said they cannot understand why NUMO and the government resumed sessions without reviewing what the organization should be, and said explanation on the misconduct is insufficient.

An 81-year-old man said he thinks discussions only about nuclear waste disposal will not be so meaningful. He suggested many people want to discuss the future of nuclear power.

NUMO says it will hold similar sessions and study the feedback.

March 5, 2018

Radioactive debris piling high in Futaba storage facility



Bags containing radioactive soil and other waste are piled up high at an interim storage facility in Futaba, Fukushima Prefecture, on Feb. 17. (Tetsuro Takehana)

SEVEN YEARS AFTER: Radioactive debris piling up at Fukushima interim facility

http://www.asahi.com/ajw/articles/AJ201803050028.html

By TETSURO TAKEHANA/ Staff Writer
FUTABA, Fukushima Prefecture--Stacks of soil and other waste contaminated by the Fukushima nuclear disaster continue to grow at an interim storage facility here.
Black bags filled with radioactive debris collected during decontamination work in various locations in the prefecture have been brought to the facility since October, when operations started.
Heavy machinery is used to stack the bags, and green sheets now cover some of the piles.
The town of Futaba co-hosts the crippled Fukushima No. 1 nuclear plant. The interim facility is expected to eventually cover about 1,600 hectares of land in Futaba and Okuma, the other co-host of the plant.
The government has acquired 801 hectares as of Jan. 29, and 70 percent of that space is already covered with contaminated debris.
Negotiations between the government and landowners are continuing for the remaining hectares.
The government plans to move the contaminated debris to a final disposal site outside the prefecture by March 2045. However, it has had difficulties finding local governments willing to accept the waste.

March 7, 2018

Kobe Steel also lied about disposal of radioactive waste

Kobe Steel also falsified data on analyses of burying radioactive waste

https://mainichi.jp/english/articles/20180307/p2a/00m/0na/017000c

Sixteen pieces of data relating to the underground disposal of highly radioactive waste generated by nuclear reactors, which scandal-hit Kobe Steel Ltd. and a subsidiary analyzed at the request of the Japan Atomic Energy Agency (JAEA), were falsified, forged or flawed in other ways, the nuclear research organization said.

- 【Related】Kobe Steel CEO steps down over data fabrication scandal
- 【Related】Kobe Steel expects net profit for FY 2017 despite data fabrication
- 【Related】Ex-Kobe Steel workers say data tampering going on for dozens of years

The government-affiliated JAEA, which commissioned Kobe Steel and its subsidiary Kobelco Research Institute Inc. to analyze data on the impact of burying highly radioactive waste deep underground, has demanded that the steelmaker redo the work.
Kobe Steel expressed regret over the matter. "We'll do our best to prevent a recurrence," said a company official.
According to the JAEA, the data in question includes that on the corrosion of metal used for cladding tubes and containers for spent nuclear fuel. Between fiscal 2012 and 2016, the Nuclear Regulation Authority and the Ministry of Economy, Trade and Industry (METI) commissioned the JAEA to conduct the analyses, and the agency farmed out the work to the steelmaker and its subsidiary.
JAEA officials said most of the data was not accompanied by records of experiments conducted in the analyses or had intentionally been altered.

According to METI's Agency for Natural Resources and Energy and other sources, the report detailing the results of the analyses will be partially corrected following the discovery of the data falsification.

March 8, 2018

Still no disposal solution in view

Radioactive waste still awaiting disposal

https://www3.nhk.or.jp/nhkworld/en/news/20180308_10/

A decision about the disposal of radioactive waste from the Fukushima Daiichi nuclear plant has yet to be made, 7 years after an accident occurred at the plant in 2011.

Japan's government plans to dispose of waste that contains more than 8,000 becquerels of radioactive substances per kilogram. Among the waste materials slated for disposal are ash, mud, and straw.

More than 203,000 tons of waste is being temporarily stored at sewage treatment plants and on farmlands in 11 prefectures.

The Environment Ministry plans to build 3 disposal facilities. Tochigi, Chiba, and Miyagi prefectures will each host one. Outside Fukushima, the largest amounts of radioactive waste are in those 3 prefectures.

Disposal efforts have gone nowhere because of local opposition to the construction plans.

The ministry says it will continue to try to persuade local residents to accept the disposal facilities.

Radioactive concentrations in waste decrease over time. The Miyagi Prefectural Government hopes to give priority to the disposal of straw, grass, and other bulky items that have safe levels of radioactive substances.

August 2, 2018

Buried safely for 100,000 years???

NRA OKs plan to bury radioactive waste from nuke plant decommissioning for 100,000 yrs

https://mainichi.jp/english/articles/20180802/p2a/00m/0na/008000c

The Nuclear Regulation Authority (NRA) plans to require that highly radioactive waste generated when nuclear reactors are decommissioned be buried underground at least 70 meters deep for about 100,000 years until the waste becomes no longer hazardous.

- 【Related】Editorial: TEPCO should quickly decommission Fukushima No. 2 nuclear plant

- 【Related】KEPCO looking to decommission 2 reactors at Oi nuke plant
- 【Related】Industry ministry to create new fund to decommission Fukushima No. 1 plant reactors
- 【Fukushima & Nuclear Power】

Moreover, disposal sites for such waste should not be built in areas that could be affected by active faults or volcanoes.
The plan is part of the proposed regulatory standards on disposal sites for radioactive waste from dismantled nuclear reactors, which the NRA approved on Aug. 1. The NRA will hear opinions from power companies operating nuclear plants and other entities before finalizing the regulatory standards.
Low-level radioactive waste generated when reactors are dismantled is graded by three ranks in descending order from L1 to L3.
The proposed regulatory standards cover L1 waste, such as containers for control rods and fuel assemblies.
There have been no regulatory standards for L1 radioactive waste even though a growing number of nuclear reactors are bound to be decommissioned under the regulatory standards for nuclear plants that have been stiffened following the outbreak of the Fukushima nuclear crisis in March 2011.
Under the proposed regulatory standards for L1 waste, electric power companies would be required to build disposal sites on stable ground. Such facilities should not be built near faults at least 5 kilometers in length. Moreover, utilities would be mandated to confirm from records or geological surveys that there has been no volcanic activity over the past 2.6 million years or so near where they plan to build the disposal sites.
Power companies would also be obligated to avoid building disposal sites near oil or mineral deposits because areas with such natural resources may be excavated in the future.
Such radioactive waste must be regularly monitored over a roughly 300- to 400-year period following its disposal to see if the waste contaminates nearby groundwater. The owners of disposal sites would then be banned from digging areas surrounding the facilities without permission from the central government.
The proposed standards also require that additional radiation exposure dosages from disposal sites be limited to 0.3 millisieverts or less a year in accordance with international standards. It is also required to confirm whether radiation doses would be below that limit even if the functions for shielding radiation were partially lost, such as the container holding radioactive waste being broken, by analyzing doses under such scenarios.
(Japanese original by Ei Okada, Tokyo Science & Environment News Department)

December 20, 2018

Morita's promises and nuclear waste

The area where construction of a possible final disposal site for highly radioactive nuclear waste was considered in Minami-Osumi, Kagoshima Prefecture, on Nov. 29. (Hiraku Toda)

Mayor confirms 'loans,' denies ties to nuclear waste site

http://www.asahi.com/ajw/articles/AJ201812200046.html

MINAMI-OSUMI, Kagoshima Prefecture--The mayor here received 8 million yen ($71,500) in unreported "loans" but returned the money apparently after lenders complained he wasn't following through on promises to bring a nuclear waste disposal site to the town.

Toshihiko Morita, 59, told a news conference on Dec. 20 that he accepted a total of 10 million yen from four people over two occasions before the mayoral election in April 2009.

But he emphasized that the money was "personal loans" for his business and had nothing to do with his political activities.

Three of the four individuals who provided the money told The Asahi Shimbun that Morita had asked them for election expenses.

The three--two heavyweights in the town and a director at a Tokyo trading house with ties to the nuclear industry--also said they wanted Morita to promote Minami-Osumi as a host of a final disposal site for nuclear waste, a potentially lucrative project that has been shunned around Japan.

In May 2009, shortly after he was elected mayor, Morita wrote a letter of proxy saying he would give the Tokyo director all the authority needed to lobby and negotiate with relevant parties to bring a final disposal site to the town.

Morita denied any relation between the money he received and the letter of proxy.

The three individuals said that in October 2017, they demanded Morita return their money, citing no progress in courting the nuclear waste facility.

The following month, Morita repaid the 8 million yen.
It was not clear if the mayor repaid the additional 2 million yen, nor the identity of the person who provided that money.

According to sources familiar with the matter, the three officials gave 3 million yen to Morita's side in January 2009 and 5 million yen on April 3 the same year, right before the official mayoral election campaign kicked off.

Although Morita said the 8 million yen was a personal loan, he did not pay interest or list the money in his official financial statements.

An official in charge of Morita's campaign told The Asahi Shimbun that the money was accepted as a "campaign fund." But Morita's election campaign income and expenditure report did not list the sum, a possible violation of the Public Offices Election Law.

That campaign report was destroyed after the expiration of the three-year preservation period set by the town.
Morita said he will correct the reports "if there are flaws."

In 2012, the year after the triple meltdown at the Fukushima No. 1 nuclear plant, the Minami-Osumi town assembly unanimously adopted an ordinance rejecting the disposal of nuclear waste and nuclear facilities in its jurisdiction.

In April 2013, Morita was re-elected on a campaign promise not to allow such facilities in the town. However, the three officials said that Morita privately told them until April 2017, when he was elected for a third time, to wait a bit longer because he still planned to bring the disposal site to the town.

The central government since 2002 has been looking for municipalities to host the final disposal sites for highly radioactive waste produced by dozens of nuclear power plants across the country.

But none has volunteered despite the financial incentives. If a local government allows a siting study as a prospective site, it will be offered 1 billion yen a year for the study and 2 billion yen a year for a boring and additional surveys.

In a report released in July 2017, the Ministry of Economy, Trade and Industry, which oversees the nuclear industry, described potential candidate sites across the country based on geological and other factors. The report said most of the land in Minami-Osumi is "favorable" as a location for a dumping ground.

The town, with a population of nearly 7,300 on the southern tip of the main island of Kyushu, considered hosting a final disposal site in 2007, when Morita's predecessor was in office.

Morita said he will continue to oppose the hosting of the radioactive waste disposal site.

February 26, 2019

Recycling Fukushima waste a "massive headache" for Govt.

Radiation-contaminated soil is kept temporarily in Futaba, Fukushima Prefecture, before being moved to an intermediate storage facility. (Asahi Shimbun file photo)

Fierce opposition to recycling radioactive soil from Fukushima

http://www.asahi.com/ajw/articles/AJ201902260058.html

How to dispose of mountains of soil contaminated by radiation from the 2011 Fukushima nuclear disaster poses a massive headache for the central government.

Officials had long insisted that contaminated surface soil removed after the triple meltdown at the Fukushima No. 1 nuclear power plant would eventually be stored outside of Fukushima Prefecture. According to one estimate, the total volume of such soil will reach 14 million cubic meters by fiscal 2021. Local entities outside of Fukushima are understandably hesitant about serving as host to such vast quantities of possibly hazardous dirt.

Officials in Tokyo are now hoping to sway local governments to act as hosts by proposing reuse of the contaminated soil for public works projects under certain conditions.

One requirement would be that soil radiation levels below 8,000 becquerels per kilogram, the standard used by the government in classifying whether the waste material requires special treatment, could be used for various construction projects.

This poses a dilemma for Fukushima Prefecture, which fears local residents will be stuck with the problem despite repeated pledges by the government to move all contaminated soil from the prefecture.

Work got under way four years ago to move contaminated soil to intermediate storage facilities in Fukushima Prefecture. As of Feb. 19, the volume of soil transported to those facilities totaled 2.35 million cubic meters.

Initially, the government set a target date of March 2045 for moving all of the contaminated soil outside of Fukushima to a permanent storage facility.

However, discussions have yet to begin on where to build the structure.

Koji Yamada, an Environment Ministry official who has been involved in the issue, conceded it will not be easy to find a candidate municipality for the facility.

"We are now at the stage of trying to obtain understanding from a national perspective," he said.
Ministry officials say that reusing contaminated soil to reduce the volume that eventually will have to be moved to the final storage facility could win favor from some municipalities.
A panel of experts set up by the Environment Ministry agreed in June 2016 that moving the entire volume of contaminated soil to a final storage facility is unrealistic.
The panel suggested that reducing the volume of contaminated soil by reusing portions deemed safe under radiation standards now in place seemed to offer the best option in finding a candidate site for the final storage facility.
It also proposed ways in which the soil could be reused; for example, in public works projects where the commissioning authority was clearly a responsible body.
The panel also proposed using the soil for the foundations of roads and embankments. It said sufficient quantities were available to ensure stable maintenance over many years.
When the panel met again last December, the members were briefed on the best-case scenario for the development of technology to reduce radiation levels in the soil. The most optimistic forecast was that as much as 99 percent of the debris could eventually be reused.
Under that scenario, only 30,000 cubic meters, or about 0.2 percent of the total volume, would have to be moved to the final storage facility to be buried there.
While Environment Ministry officials say that reusable treated soil would be considered for locations both within and outside Fukushima Prefecture, the only specific proposals made to date have been limited to three municipalities in Fukushima.
Local residents in two of those municipalities, one of which is Nihonmatsu, have mounted petition drives and other activities to block the reuse of contaminated soil in their areas. They contend that allowing such plans to go ahead would be at odds with government promises to store the soil outside of the prefecture.
The fact remains that the bulk of the contaminated soil is stored in Fukushima Prefecture. However, seven other prefectures also have a combined 330,000 cubic meters stored at various locations, such as parks and farmland.
Since August 2018, the Environment Ministry has been trying to determine whether using contaminated soil for land reclamation projects would prove detrimental to the health of local residents.
It has conducted field trials in Nasu, Tochigi Prefecture, and on the grounds of a facility operated by the Japan Atomic Energy Agency in Tokai, Ibaraki Prefecture.
But Nasu resident Masato Tashiro, who has been following the issue, was highly critical of the six-month period authorized to confirm the safety of such soil.
"That is way too short to make such a judgment, considering the fact the soil will be buried for such a long time," Tashiro said. "Residents fear their health may be impaired over the long-term."
(This article was written by Teru Okumura and Shintaro Egawa.)

Decommissioning

August 11, 2013

Decommissioning large reactors for the first time

JAPAN: Dismantling of large-scale nuke plants begins at last

http://ajw.asahi.com/article/globe/feature/reactor/AJ201308110005

The Asahi Shimbun GLOBE

At Chubu Electric Power's Hamaoka nuclear power plant in Omaezaki, Shizuoka Prefecture, preparations are being made to dismantle and remove the first and second of its five reactors.

"Move the apparatus!" "You got it!" The voices of workers echo around the inside of the structure that houses the second reactor. An 88-ton carbon steel cylindrical capsule more than six meters long is suspended from a crane and slowly lifted 26 meters to the fifth floor.

Twenty-two spent nuclear fuel units held in a pool on the fifth floor are collected into the capsule. Then the capsule is moved in a purpose-built trailer to the pool for the fifth reactor, which is located within the same site. The capsule has screw-like grooves carved into them to allow the heat produced by the fuel to escape.

Yoshiaki Shimizu, 55, the decommissioning project's group chief, says no radiation would leak out if a capsule fell to the floor during the operation.

"What's more, we have devices on standby just in case that will prevent radiation from leaking outside," he says.

If spent nuclear fuel is not extracted from the inside of a reactor, it cannot be taken apart. The extraction process is fraught with danger due to the potential of radiation exposure to workers and radiation leaks. Large capsules are used, and the process is carried out cautiously.

When the second reactor ceased operating in 2009, there were 1,312 nuclear fuel units held in the fifth floor pool. The transfer of just one took several days, and 724 were left as of late June. The operation will end by late February 2014 at the earliest. The pool for the first reactor has already been emptied.

A number of workers measured the radiation level inside the structure housing the second reactor. They spent several months checking 10,000 spots to create a contamination map of the entire facility. The careless destruction of a structure in a radiation controlled area would be disastrous.

To date, five of Japan's key nuclear reactors have ceased operations in order to be decommissioned, including the two reactors at Hamaoka. The dismantling and removal of the 12,500-kilowatt Japan Power Demonstration Reactor at Tokaimura, Ibaraki Prefecture, was completed in 1996. Currently, the Japan Atomic Power Co. (JAPC)'s 166,000-kilowatt Tokai Power Station at Tokaimura and the Japan Atomic Energy Agency (JAEA)'s 165,000-kilowatt Fugen advanced thermal reactor prototype in Tsuruga, Fukui Prefecture, are in the midst of being decommissioned.

The Hamaoka plant's first (540,000 kilowatts) and second (840,000 kilowatts) reactors are much larger than its other three. Additionally, **the reactors that are being decommissioned and those that are scheduled to continue operating are on the same site**. Such a case is the first for Japan.

"Our staff will be able to experience running a reactor at the same time as being involved in shutting another down," says Motonori Nakagami, 55, a group chief in Chubu Electric Power's nuclear power division.

The decommissioning process is running slightly behind schedule. This is because many of the approximately 2,300 staff that were to be involved in shutting down the first and second reactors have

been preoccupied with inspections of the third, fourth and fifth reactors, which have been stopped since the accident at the Fukushima No. 1 nuclear power plant.

The combined cost of decommissioning the first and second reactors has been estimated at 84.1 billion yen ($840.8 million). It will be a lengthy endeavor, taking nearly 30 years. Throughout that period, their functions that prevent radiation leaks will continue to be maintained, and the structure itself will be constantly repaired as it is used.

The decommissioning of the Tokai reactor, which ceased operating in 1998, is at a more advanced stage. All of its spent nuclear fuel has been removed, and the surrounding apparatus is being dismantled as the JAPC waits for the radiation level inside to go down.

The disassembly of the reactor's four heat exchangers began in 2006. These cylinders, 25 meters tall and six meters in diameter, are being taken apart by slicing them into rings from the bottom up and removing them one at a time. Workers observe from a separate room as a French-made robot cuts into the cylinders. The dismantling of the reactor will begin from fiscal 2014, and the entire process is scheduled for completion in fiscal 2020.

Power companies want to minimize decommissioning costs as much as possible. "Rather than developing new apparatus, we're using a combination of technology that's already available to us to rationalize the process," says JAPC division manager Toyoaki Yamauchi.

Cost reduction is also a priority for the decommissioning of the Fugen reactor. According to the JAEA's Shigetoshi Iwanaga, 59, "We're drawing on foreign expertise as we consider the cheapest way of taking it apart."

(The first part of this article was written by GLOBE writers Norito Kunisue and Hitoki Nakagawa.)

UKRAINE: CAN MELTED NUCLEAR FUEL BE EXTRACTED?

The worst nuclear disaster in history occurred in April 1986 at the Chernobyl plant in Ukraine. Its fourth reactor exploded during a test run, releasing 5,200 quadrillion becquerels of radioactive material in the first 10 days, roughly sixfold that of the accident at the Fukushima No. 1 nuclear power plant.

Just as with ordinary nuclear plants, the disassembly and removal of the reactors that caused these catastrophes cannot begin until their nuclear fuel is extracted.

Even today, 27 years after the Chernobyl accident, the fourth reactor still contains nuclear fuel that has melted and solidified. It produces a level of radiation that would instantly kill anyone who approached it, and cannot be touched until a suitable robot is developed. Extraction will be impossible for quite some time, and the reinforced concrete “stone coffin" that entombs the structure and prevents radiation from leaking out is the only measure that can be taken at present.

Today, crevices and cracks can be found all over the stone coffin. Rainwater that has flowed inside in large amounts is thought to have become contaminated and started leaking into the earth. A major repair effort was carried out from 2004 to 2008, reducing the threat of collapse for the time being. Construction is proceeding on a massive shelter that will cover the stone coffin in order to carry out more permanent countermeasures. There are plans to tear down the stone coffin and remove the nuclear fuel when the shelter is completed in 2015, but there is no concrete schedule.

* * *

Tokyo Electric Power Co. has made a decision to decommission reactors No. 1 through No. 4 at its Fukushima No. 1 nuclear power plant.

TEPCO and the Japanese government are planning to extract the nuclear fuel that is thought to have burned through pressure vessels within reactors No. 1 through No. 3 and remove the structures surrounding them. Thirty to 40 years later, the site will be turned into a vacant lot.

On June 27, the government and TEPCO revised their mid- to long-term decommissioning road map. With regard to when the fuel in reactors No. 1 through No. 3 would be extracted, it states that work on reactors No. 1 and No. 2 will begin in the first half of fiscal 2020 at the earliest, and on reactor No. 3 in the latter half of fiscal 2021. This meant that the extraction process for reactors No. 1 and No. 2 will commence around 18 months earlier than was initially planned.

In reality, there is no technical evidence to support these projections. As a form of “insurance," the plan also states that the commencement date will be shifted back to the first half of fiscal 2024 in the event that little technological progress is made.

To extract nuclear fuel, it is necessary to fill a reactor with water to block the radiation. For that purpose, the damage the reactor has sustained must first be ascertained and then repaired.

It is not yet known where and to what degree it is damaged, or the condition of the fuel that is thought to have burned through its vessels. Surveys were attempted using a remotely controlled robot, but to little success.

Some melted fuel escaped from its pressure vessel and burned through into the containment vessel. There are three reactors where this has occurred, and a wide range of experts will have to pool their knowledge and devise countermeasures in order for the decommissioning process to move forward.

However, more than two years on from the disaster, the system in place for developing fuel extraction technology is still inadequate.

* * *

The second reactor at the Three Mile Island nuclear plant near Middletown, Pa., where a partial meltdown occurred in March 1979, has not yet been dismantled and removed. Even so, the process is at a more advanced stage than at the Chernobyl and Fukushima No. 1 plants.

Several years after the accident, camera inspections of the reactor core commenced, and a work program was carefully devised with input from the nuclear industry, the government and academia. Fuel extraction began in 1985, and by 1990, almost all of it was successively removed. Around half of the fuel was said to have melted through.

Meanwhile, the station's first reactor, located on the same site, has been approved for operation until 2034 and continues to run. To efficiently decommission the reactors, the second will be disassembled at around the same time as the first. The process itself will not begin in earnest for some time down the road.

(The Ukraine portion of this article was written by Naoatsu Aoyama, GLOBE staff writer, and Hisashi Hattori, senior staff writer of The Asahi Shimbun.)

GERMANY: Know-how from a leader in nuclear power abandonment

http://ajw.asahi.com/article/globe/feature/reactor/AJ201308110014

The Asahi Shimbun GLOBE

The Greifswald nuclear power plant on the shore of the Baltic Sea in northern Germany is a three-hour drive from Berlin on the Autobahn.

During its operational phase when East Germany existed, the plant provided 10 percent of the electrical power consumed in the former German Democratic Republic. Today, it is entering the final stage of the decommissioning process.

Reactors No. 1 through No. 5, each once capable of generating 440,000 kilowatts of power, were shut down by 1990 due to rising concerns about the safety of Soviet-designed plants following the 1986 Chernobyl nuclear power plant accident.

Decommissioning of the plant started in 1995.

“Of the 30 steam generators, eight have been completely dismantled. We are deliberately taking our time. The work proceeds as we thoroughly sort and classify waste matter," said Gudrun Oldenburg, deputy head of the PR Department for EWN, a government-funded entity that is responsible for the cleanup.

Most of the equipment in the buildings, such as the reactors, turbines and steam generators, has been moved to an interim storage site on plant grounds. Within the expansive 20,000-square-meter storage facility, which looks like a huge warehouse, the temporarily transferred equipment has been arranged into orderly lines. Radiation levels beside the reactor parts read 50 microsieverts per hour. This is about the same reading as high-dose areas around the Fukushima No. 1 nuclear power plant.

In the work area, employees in coveralls and wearing protective masks labored to disconnect pieces of machinery, their cutting tools creating a shower of sparks. Equipment from inside the reactors is dismantled inside an isolated booth using tools that are operated remotely. In a different booth, workers in protective clothing resembling space suits sprayed equipment with water and an abrasive agent to decontaminate it.

"We have more than 20 years of accumulated experience in the decontamination and management of waste, more than any other nuclear power plant. We are happy to offer our skills and technology to anyone," said EWN's plant manager Henry Cordes.

The company has assisted with dismantling work at the Chernobyl nuclear power plant and other plants in Eastern Europe. Since 2002, it has been helping to dismantle Russian nuclear submarines.

After the accident in Chernobyl, anti-nuclear sentiment spread among the German people, and old nuclear power plants and those with poor profitability were slated for decommissioning. As Germany has been at the forefront of decommissioning nuclear reactors in Europe, it has accumulated know-how that allows it to dismantle and remove nuclear plants safely and efficiently.

After the accident at the Fukushima plant, the Merkel-led government decided to abandon nuclear power generation altogether and revoked operating licenses for eight plants. The nine remaining in operation will lose their licenses by 2022. As decommissioning increasingly spreads, companies will be looking to acquire more technology.

Next year, decommissioning will be completed on the Wurgassen nuclear power plant (670,000 kilowatts) operated by E.ON, a leading gas and power company. The work started in 1997, and 10,000 drums of waste matter are stored at a temporary facility constructed on the site's premises.

The company plans to move the drums to a disposal site that the government intends to construct by 2019. Manfred Winnefeld, the E.ON's plant manager, said: "Decommissioning was supposed to be completed in roughly 10 years. However, work did not proceed as smoothly as envisioned and in 2003 the schedule was revised substantially."

Even so, completing the work in roughly 16 years is quick when compared to other nuclear plants, he added.

In June, E.ON established a decommissioning business.

Erich Gerhards, senior vice president in charge of dismantling and disposal, said, "We would like to sell our process and management know-how, which has been built through extensive experience, including failure, to the global market."

(The first part of this article was written by Hisashi Hattori, senior staff writer of The Asahi Shimbun.)

NORWAY: PROMOTING VIRTUAL REALITY TECHNOLOGY

Wearing 3D glasses, I stood in front of a large screen roughly 2 meters high and 4 meters wide. The power generator projected onto the screen drew increasingly nearer. Using my hands, I grabbed hold of objects on the screen and moved them around. Sensors at the bottom of the screen sensed my movements.

Known as "Decommissioning Avatar," this leading-edge system, which employs virtual reality to recreate actual nuclear reactor decommissioning sites, was developed by Norway's Institute for Energy Technology (IFE).

It is used to confirm operational processes for work related to decommissioning a reactor and to investigate any associated risk in advance of carrying out actual work.

"The catalyst for development was technical cooperation with Japan," said IFE division head of software engineering, Terje Johnsen, 53. Work first began on using virtual reality technology when the institute was requested to simulate decommissioning of the Fugen advanced thermal reactor prototype located in Fukui Prefecture.

Compared to demolishing a regular building, there are a number of major differences in dismantling a nuclear power plant.

While proceeding with the dismantling, it is important to keep air conditioning and other equipment functioning right until the very end. While work progresses, wires and pipes that must be left

operational need to be carefully selected from among an intricate maze of wiring and plumbing running throughout the plant.

Additionally, in order to reduce radioactive waste as much as possible, parts and rubble resulting from the dismantling must be carefully classified and sorted according to their level of contamination. To minimize exposure to workers, radiation levels at the site must be monitored and understood at all times.

Wanting “simulation technology that would ensure both safety and efficiency," the Fugen side approached Norway's IFE, with whom it already had a cooperative relationship, about developing an appropriate system.

In hindsight, Masanori Izumi, 34, who works for the Japan Atomic Energy Agency, operator of the Fugen plant, said: “At that time Japan's experience with decommissioning was minimal, we really didn't know much about it. We wanted to use virtual reality to acquire a realistic image of the work at hand."

The result was a system named VRdose. Computer graphics are used to recreate the actual site on a monitor. Avatars representing workers are made to move about the virtual site, allowing exposure doses to be calculated. It is possible to simulate a variety of movements and compare doses each time. At the time, the system was attracting global attention as a never-before-tried initiative.

Applying this technology, the IFE has created all kinds of simulation technology similar to the “Decommissioning Avatar" system.

The IFE provided a virtual reality program to the Leningrad nuclear power plant in Russia for use in the maintenance of its aging reactors. And, working cooperatively with the Norwegian army, it also built training software for dismantling retired Russian nuclear submarines. The institute is also engaged in developing software for aiding in the decommissioning of the Chernobyl nuclear power plant.

The IFE is an independent organization that is not affiliated with the government or any university.

Its mission is to develop “useful technology." István Szöke, 35, a senior researcher in software engineering at the institute, said, “Decommissioning should develop into quite a substantial business. We want to expand our range of activities going forward."

(The second part of this article was written by Norito Kunisue of GLOBE.)

Dismantling - from an expert

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August 15, 2013

Japanese officials visit Hanford

Nagasaki Bomb Maker Offers Lessons for Fukushima Cleanup

http://www.bloomberg.com/news/2013-08-15/nagasaki-bomb-maker-offers-lessons-for-japan-s-fukushima-cleanup.html

By Shigeru Sato & *Yuji Okada - Aug 15, 2013 11:00 PM GMT+0200*

Hanford Engineer Works produced the 20 pounds of plutonium for the bomb dropped on Nagasaki. It's among the most toxic nuclear waste sites and the place Japan is turning to for help dealing with melted reactors in Fukushima.

Tokyo Electric Power Co. (9501) has sent engineers on visits to the Hanford site in Washington state this year to learn from decades of work treating millions of gallons of radioactive waste. Hanford also has a method to seal off reactors known as concrete cocooning that could reduce the 11 trillion yen ($112 billion) estimated cost for cleaning up Fukushima.

Workers demolish a decommissioned nuclear reactor during the cleanup operations at the Hanford site in Washington state on March 21, 2011. Photographer: Mark Ralston/AFP/Getty Images

Hanford stretches over 586 square miles of scrubland southeast of Seattle where thousands of technicians are decommissioning the nine reactors in operation from 1944 to 1987. Its laboratories and plutonium facilities were integral to the Manhattan Project to make the first atomic bomb.

"The U.S. has vast experience in nuclear technology with their military activity, including decontaminating soil and managing river contamination," Masumi Ishikawa, general manager of Tokyo Electric's radioactive waste management, said in an interview. "There's a lot we can learn from them."

Japan Prime Minister Shinzo Abe agreed with that last week when he told his fellow citizens for the first time that Tokyo Electric alone isn't able to handle the disaster at the Dai-Ichi plant. He promised more government funds for the cleanup without saying how they'd be used.

Hanford Leaks

Abe's comments followed a long series of mishaps by the utility known as Tepco, resulting in its admission last month that hundreds of tons of radioactive water is flowing into the Pacific Ocean more than two years after three reactor cores melted down at the plant.

Hanford has its own share of containment challenges. Six underground tanks leaking radioactive waste may offer lessons to Tepco in dealing with substances that contaminate everything they come in contact with. The tanks are among 177 buried at Hanford, about 200 miles (320 kilometers) southeast of Seattlealong the Columbia River.

The U.S. Department of Energy has spent more than $16 billion since 1989 to clean up Hanford. The weapons production generated 56 million gallons of radioactive waste, enough to fill a vessel the size of a football field to a depth of 150 feet, according to a December report by the U.S. Government Accountability Office.

Fukushima Fifty

Tepco's Ishikawa said visits by him and other company engineers to Hanford are part of an agreement with the Department of Energy to evaluate the technology for possible use at Fukushima.

Ishikawa, 46, studied nuclear engineering at Tohoku University in Sendai City, northeast Japan, and is one of the Fukushima Fifty.

The name refers to a group of engineers who stayed in the Japanese plant to fight the disaster as power was lost and reactor buildings exploded. Ishikawa was the right-hand man of Masao Yoshida, who led the group. Yoshida died on July 9 of esophageal cancer. He was 58.

At Hanford, the energy department finished a $65 million cocooning project in June last year, the DOE said in a statement. That involved demolishing the last one of the nine reactor buildings down to the four-foot- (1.2 meter) thick concrete shield around the reactor core.

More concrete was added to the shield, along with a new concrete roof to put the reactor into so-called safe storage for 75 years. This allows radiation levels to decay to safer levels in the core and gives the operator time to determine the final disposal method, according to the statement.

Cocooning Reactors

There are three ways to decommission nuclear reactors, said Ishikawa. One is immediate dismantling. Another, used at the wrecked Chernobyl plant in Ukraine, entombed the whole building in concrete. The third is cocooning used at Hanford. Entombing and cocooning cost less than immediate dismantling as it reduces the expense for handling and moving highly radiated material, Ishikawa said.

Tepco is talking with the DOE on whether cocooning could work for the crippled reactors in Fukushima. Sealing them off in concrete for 75 years would allow more focus on cleaning up surrounding areas so that residents could return, said Ishikawa.

Around 160,000 people were forced to evacuate from towns and villages when the Dai-Ichi plant released clouds of radiation after it was hit by an earthquake and tsunami on March 11, 2011.

"Decommissioning is vital for the areas around Fukushima Dai-Ichi to move ahead with restoration," Ishikawa said.

Visiting Fukushima

Officials from the DOE involved with Hanford have visited the Fukushima Dai-Ichi plant three times as part of a six-month agreement with Tepco to investigate the conditions there and what solutions they can offer, he said.

"We identified seven areas of U.S. expertise that can be tapped," said Ishikawa. "That includes decommissioning, nuclear waste disposal, removal of melted fuel, and restoration of surrounding areas."

Ishikawa said talks with the DOE continue and he couldn't provide a date on when any agreement may be reached for using expertise and technology developed at Hanford.

"The United States remains committed to working with Japan in their remediation efforts and believes that Japan can continue to leverage U.S. knowledge and experience in the environmental management area," said Lindsey Geisler, a DOE spokesperson.

"The Energy Department's environmental cleanup mission is one of the world's largest programs of its type," Geisler said in an e-mail response to questions.

Ishikawa said in his visits to Hanford he's seen decontaminated areas coming back to life, noting for example a winery that's been built. That, he said, is what he wants to see in Fukushima.

To contact the reporters on this story: Shigeru Sato in Tokyo at ssato10@bloomberg.net; Yuji Okada in Tokyo at yokada6@bloomberg.net

August 18, 2013

Decommissioning requires urgent attention - in Japan and elsewhere

How will Japan prepare for age of decommissioning reactors?

http://mainichi.jp/english/english/newsselect/news/20130818p2a00m0na002000c.html

Currently, there are 17 nuclear reactors in Japan that were first activated 30 or more years ago. Among them, three were started 40 or more years ago. Under the principle of operating for 40 years that was included in the revised Nuclear Reactor Regulation Law that went into effect in July, 11 reactors will be shut down in the next five years, and the number will climb to 17 in the next 10 years. Add in the other reactors from Fukushima Prefecture, which has declared it will get rid of its nuclear plants, and the number rises to **20.**

Meanwhile, after the Great East Japan Earthquake and tsunami, an uncertain future awaits other nuclear reactors like the No. 2 reactor at the Tsuruga Nuclear Power Plant, said to have an active quake fault directly beneath it, and reactors at the Oi, Mihama and Shika nuclear power plants, which are suspected of also having active faults. In any case, it is certain that reactors will need decommissioning in the future.

Decommissioning will not only occur in Japan, but other countries as well. According to the Nuclear Safety Review 2013, put together in July by the International Atomic Energy Agency, **out of the 437 nuclear reactors in the world, 162 of them, or nearly 40 percent, are at least 30 years old**. Analysis also exists that says the average lifespan for the 153 reactors in the world that have already been shut down has been 24 years. If, like those reactors, others do not last for the full 40-year period, we will see a sharp jump in the amount of reactor decommissions.

How should Japan prepare for this age of reactor decommissioning? Lately, topics that come up regarding this problem are the creation of an organization to dismantle reactors and the possibilities of reactor decommissioning as a business. **Different knowledge from that needed for nuclear plant construction is required for decommissioning reactors, like radiation management, waste disposal, and decontamination. It is also a long and expensive process.**

Makoto Hasegawa, head of a department of the Japan Atomic Energy Agency dealing with reactor decommissioning, says, "If we assume a decommission rate of around 20 reactors every 10 years, we need a coordinating organization that will gather the needed skills and keep down costs while doing efficient work."

An example of such an organization that has gathered attention is Britain's Nuclear Decommissioning Authority (NDA). It was set up as a national organ to deal with the decommissioning of old reactors after plants in that country were privatized in 1990. As of January 2013, it had taken control of around 30 reactors and set a plan for decommissioning them. The NDA puts the management of decommissioning up for international bidding, with private companies working under the bid winners on the actual decommission work. An independent supervisory committee watches over the decommissioning companies.

The system is set up so the national government takes on the property and debts of nuclear plants, while using private competition to decommission the reactors and process the nuclear waste.

Would a Japanese version of the NDA be possible? Hasegawa has imagined a variety of versions, such as a nationally-led organization, a private sector-led one, and a mixture of the two. In the case of a nationally-led body, challenges include securing the organization's independence and getting enough help from the private sector. Even in a private sector-led version or a mixed form, though, if power companies or independent administrative corporations became the parent companies in decommissioning work, it could stunt competition.

In the United States, meanwhile, there are cases where a company specializing in decommissioning is given temporary ownership of a nuclear reactor destined for dismantling. That company is involved in decommissioning in other countries as well and is participating in plans for treatment of contaminated water at the Fukushima No. 1 Nuclear Power Plant. Such activities could serve as a source of reference for Japan as it plans its own decommissioning business.

At any rate, **since decommissioning work stretches over dozens of years, talented personnel who will pass on their skills will be needed**. "There are those who see decommissioning work as less attractive than power plant construction, but if society can show it as a field where young people can challenge themselves, people will want to do the work," says Hisaki Mori, who is a representative of an environmental information network and knowledgeable on the reactor decommission issue.

The ruling Liberal Democratic Party won the House of Councillors election by a landslide, and focus has gathered on restarting Japan's idled nuclear power plants. However, the decommissioning of reactors and the processing of nuclear waste require urgent attention. (By Yuri Aono, Expert Senior Writer)

August 19, 2013

26 years of operation - 90 years of decommissioning

British nuclear plant needs 90 years for decommissioning after 26 years in operation

http://mainichi.jp/english/english/newsselect/news/20130819p2a00m0na019000c.html

GWYNEDD, Wales -- The Trawsfynydd Power Station in western Wales in Britain is one of the world's most advanced nuclear power plants when it comes to decommissioning work. It had two gas-cooled reactors with a combined output capacity of 235,000 kilowatts.

The operator of the power station started decommissioning the power plant in 1993. A senior official in charge of the decommissioning work says 99 percent of radioactive materials have been removed. But it will still take 70 more years for the operator to finish decommissioning the nuclear plant.

The Mainichi witnessed firsthand the ongoing decommissioning operation of the plant in Wales, which is taking a lot of time and at huge cost, and got a reminder of the tough road ahead for Japan to decommission the crippled Fukushima No. 1 Nuclear Power Plant in the aftermath of the 2011 Great East Japan Earthquake and tsunami.

Two concrete buildings cover the nuclear reactors in Wales, which sit by a manmade lake.

Magnox Ltd. instructed us to wear helmets and special eyeglasses to protect our eyes. The Mainichi Shimbun was the first Japanese news organization to be admitted to this power station since the March 2011 nuclear disaster at the Fukushima power plant, which is owned by Tokyo Electric Power Co. (TEPCO).

As we entered the nuclear reactor building, there was a huge dark brown container, which officials say is a portion of a boiler to produce vapor for hydroelectric turbine operations. On the top floor of the building, scaffolding was in place along the wall, and workers were preparing to carefully dismantle upper portions of the building. The structure's height will be trimmed from about 53 meters to about 30 meters to maintain the safety of the concrete wall until the power station is decommissioned.

The Trawsfynydd Power Station started operations in 1965 and was shut down in 1991. Spent nuclear fuel (fuel rods) were removed from the nuclear reactors in 1995, but the radiation dose of low-level radioactive substances around pressure vessels and inside interim storage facilities is still high. Accordingly, Magnox will temporarily halt decommissioning work in 2026 before embarking on the final phase of the decommissioning campaign such as the permanent disposal of nuclear waste in 2073.

Vic Belshaw, programme delivery manager at Magnox, said **nuclear power plants built in the initial phase of nuclear power generation were not designed with future decommissioning in mind.** Workers are encountering many new things and feeling their way in their decommissioning operations.

Decommissioning work was under way at a contaminated water purification installation (33 meters in length, 5 meters in width and 6 meters in height) adjacent to the nuclear reactor building. Contaminated water caused by the cooling of fuel rods and decontamination work has already been cleared. Three machine tools (weighing 5 metric tons each), remotely controlled by workers in a separate room, are slowly scraping off contaminated walls.

Because of radiation exposure fears, workers are only allowed to work inside the buildings for a short period of time and many are engaged in remote control operations. Radioactive substances were collected and sealed and later taken to the interim storage facilities on the premises.

About 800 people are engaged in decommissioning work, outnumbering those who had operated the nuclear power plant. Because the initial phase of the decommissioning operation takes more than 30

years, recreational facilities and other buildings have been built on the premises. All facilities will be dismantled in 2083 after the decommissioning work is suspended and resumed. Decommissioning the power plant thus takes far longer than the 26 years of the plant's operations.

The Trawsfynydd Power Station was relatively small in size and started decommissioning smoothly after going offline thanks to the absence of any major accidents. But it will take 90 years to decommission the plant and the final price tag will come to about 600 million pounds (about 90 billion yen).

Robin Phillips, an environment, health, safety, and security manager at Magnox, predicted that Japan has to utilize many robots to decommission the ill-fated Fukushima nuclear plant because workers have limited mobility, as compared to the Trawsfynydd plant. It is certain the Fukushima decommissioning task will be **unimaginably tough**, he added.

While decommissioning the British power plant appears to have progressed smoothly, there are many challenges facing the plant, and the biggest issue is finding a location to permanently store radioactive materials.

In October 2006, Britain decided to bury the radioactive substances deep in the ground. Two cities in Cumbria County signaled their willingness to accommodate the substances. But the Cumbria County Council in January this year rejected the plan for fear of potential adverse effects on the tourism-oriented Lake District.

The British government says it is possible to open a permanent storage facility by the middle of 2070 because there are many places that will offer help due to the potential economic benefits. But **so far there is no place to build a permanent storage facility while decommissioning work is under way.**

The Trawsfynydd station plans to temporarily store mid-level radioactive waste on the premises but whether or not all of the facilities can be dismantled depends on the location of a permanent storage facility.

Meanwhile, British taxpayers are shouldering a heavy burden due to the decommissioning campaign. The British government decided to halt old nuclear power plants with poor output rates at an early date because they could not be privatized. It has decided to nationalize such old reactors and pay for decommissioning them. The government is expected to shoulder about 59 billion pounds (about 8.85 trillion yen) in total but the total cost may further rise.

Decommissioning the Trawsfynydd station was originally estimated to cost about 300 million pounds (about 45 billion yen) in 2005 but fiscal 2012 estimates put the cost at about 600 million pounds (about 90 billion yen). A reserve fund set aside while the plant was in operation was not sufficient because some of the money was diverted to the construction of new nuclear power plants. The decommissioning costs will thus be shouldered by taxpayers' money.

The employment of workers after dismantling the power station is another headache. About 500 subcontractors, many of them local residents, work at the power station. There will be no work for contractors at the plant in 2026, and there is no industry in the area to hire them. Magnox initiated a job-training and mediating program for the workers last year, but David Finchett, operations manager at Magnox, says it is not easy for them to find employment locally. It is tough for them to continue working without knowing where their next job will come from, he said.

The British government established the Nuclear Decommissioning Authority (NDA) in 2005 to dismantle nuclear power plants. The agency has 19 nuclear facilities to decommission and to dispose of their radioactive substances. Adrian Simper, the NDA's strategy and technology director, said power generation comes with certain risks and costs. It's unreasonable for anyone to say they do not want to pay for the electricity they use. The official also added that Japan probably needs a public entity to dismantle the Fukushima power plant and Britain is willing to help Tokyo with its technical know-how. (By Takayasu Ogura and Takayuki Sakai, Europe General Bureau)

Decommissioning Japanese reactors

Stricter nuclear plant safety standards to force decommissioning of reactors

http://mainichi.jp/english/english/newsselect/news/20130819p2a00m0na012000c.html

The enforcement of stricter nuclear power safety standards in the wake of the Fukushima nuclear disaster has made it realistic that many reactors across the country must be decommissioned sooner or later.

Besides the No. 1 to 4 reactors at the disaster-hit Fukushima No. 1 Nuclear Power Plant, only three commercial nuclear reactors are currently undergoing procedures for decommissioning and dismantling. The three are the Tokai plant with an output of 166,000 kilowatts run by Japan Atomic Power Co. (JAPC), and the No. 1 and 2 reactors at Chubu Electric Power Co.'s Hamaoka plant with outputs of 540,000 and 840,000 kilowatts, respectively.

JAPC estimates that it will cost a total of 88.5 billion yen to decommission and dismantle its Tokai power station, while Chubu Electric Power foresees it will cost a combined 84.1 billion yen to decommission Hamaoka plant's No. 1 and 2 reactors, with the goal of completing the process by fiscal 2036.

However, the NRA enforced new safety standards in July this year to prevent catastrophic accidents involving nuclear plants, similar to that at the Fukushima No. 1 plant. Moreover, the government set the upper limit of the period of operation of each nuclear reactor at 40 years in principle.

The NRA's new safety standards stipulate that the most advanced safety measures must be implemented for existing reactors, requiring larger-scale remodeling for older reactors. Of the 50 commercial reactors across the country, 17, or about 30 percent, have been in operation for more than 30 years. Their operators will be forced to choose between drastically remodeling or decommissioning such aging reactors sooner or later.

It costs a huge amount of money to decommission and dismantle nuclear reactors. In 2007, the Economy, Trade and Industry Ministry estimated that it costs roughly 65.9 billion yen to decommission a boiling-water nuclear reactor like those at the crippled Fukushima plant and 59.7 billion yen to dismantle a pressurized-water reactor like many of those in western Japan. Moreover, the ministry estimated that 3 trillion yen would be needed to decommission all the reactors throughout the country.

Such being the case, the ministry is considering revising the system to use electricity charges to sufficiently cover costs of decommissioning nuclear reactors in anticipation that a large number of such reactors must be decommissioned at the same time under the stricter safety regulations.

In the meantime, the estimated expenses of decommissioning the crippled No. 1 to 4 reactors at the Fukushima No. 1 plant have been only snowballing. Plant operator Tokyo Electric Power Co. (TEPCO)

has so far invested 957.9 billion yen on such efforts. However, there are no prospects for developing a method of treating radioactive water accumulating on the premises of the power station in the foreseeable future, and it will cost the utility a massive amount of money to develop new technology to recover and store melted nuclear fuel.

To cope with the challenge, the national government set up the International Research Institute for Nuclear Decommissioning (IRID) comprised of 17 nuclear plant operators including TEPCO earlier this month in an effort to shorten the time required to decommission a reactor, which currently takes up to 40 years.

Hajimu Yamana, president of the IRID, underscored the need to learn from overseas technology for decommissioning nuclear reactors.

"We can't tackle the challenge of decommissioning the Fukushima reactors without learning from the Three Mile Island and Chernobyl nuclear disasters as well as from Britain, which has broad experiences in decommissioning nuclear reactors," Yamana, also professor at Kyoto University Research Reactor Institute, told a news conference on Aug. 1.

October 17, 2013

Any ideas on how best to scrap Fukushima Daiichi?

Japan open to all ideas on how Fukushima No. 1 can be scrapped

AFP-JIJI
http://www.japantimes.co.jp/news/2013/10/17/national/japan-open-to-all-ideas-on-how-fukushima-no-1-can-be-scrapped/#.UmDTRlM0_9k

Japan will solicit proposals from **both domestic and overseas** nuclear experts and firms on how best to scrap the ruined reactors at Tokyo Electric Power Co's Fukushima No. 1 nuclear plant, officials said Thursday.

The International Research Institute for Nuclear Decommissioning will publicly seek ideas as early as this month, an institute official said.

While it is not presently putting the entire decommissioning process out to tender, the body's move will be welcomed by the international community, which has long called for Japan to make better use of available expertise around the globe.

The institute, formed by nuclear-related firms and government-backed bodies in August to dismantle the crippled reactors, will screen decommissioning proposals and take the results to the government, the official said.

"We will set up a website in both Japanese and English to notify interested parties at home and abroad of our calls for decommissioning ideas so that we can offer more useful and practical proposals to the government," the official said.
The central government has played an increasingly active role in the clean-up at Fukushima, where the March 2011 tsunami disabled cooling systems, sending three reactors into meltdown.

Tepco, which was effectively nationalized by a huge government cash injection to prevent its bankruptcy, has come in for growing criticism over its handling of the disaster.

Frequent mishaps, including radioactive water spills and a power outage caused by a rat, have not helped its standing in the eyes of the global public.

Tepco's own estimates suggest that the full decommissioning of the site could take up to four decades and that much of the trickier work is yet to be done — notably the removal of reactor cores that have probably melted beyond recognition.

According to the utility's own plan, these cores — which are feared to have entered the containment vessels and possibly even eaten through thick concrete — are to be removed around summer 2020.

Although Tepco claims the reactors are now under control, critics say the plant remains in a precarious state and at the mercy of extreme weather or further earthquakes. They point out that there is still no plan for the thousands of tons of water being stored on-site.

Tens of thousands of people who were evacuated from the area around the plant are still unable to return home, and scientists have said some areas will have to be abandoned forever because of radioactive contamination.

October 23, 2013

TEPCO ready to start tackling No.4

Tepco eyes fuel removal from Fukushima reactor 4 pool in early November

Kyodo http://www.japantimes.co.jp/news/2013/10/23/national/tepco-eyes-fuel-removal-from-fukushima-reactor-4-pool-in-early-november/#.Umi81VM0_9k

October 24, 2013

TEPCO eyes fuel removal from Fukushima No. 4 unit starting early Nov.

http://mainichi.jp/english/english/newsselect/news/20131024p2g00m0dm034000c.html

TOKYO (Kyodo) -- Tokyo Electric Power Co. plans to start removing nuclear fuel from the spent fuel pool at the top of the No. 4 reactor building at the crippled Fukushima Daiichi plant in early November, about a week earlier than scheduled, sources close to TEPCO said Wednesday.

The process, to continue until the end of next year, will mark a new stage in the decommissioning of the Nos. 1 to 4 units severely damaged in the nuclear crisis triggered by a huge earthquake and tsunami on March 11, 2011.

The No. 4 unit was the only one of the four not to experience a reactor meltdown, with all of the reactor fuel stored in the spent fuel pool during maintenance work. But there is concern over the continued storage of the more than 1,000 fuel assemblies in the pool, located inside a reactor building that suffered a hydrogen explosion.

TEPCO had planned to begin the process from mid-November, but it has nearly completed preparations, including the installation of a crane to remove the fuel.

If the safety of the equipment is confirmed by the Nuclear Regulation Authority, TEPCO will start taking out the fuel.
The fuel will be placed in containers and taken to another pool in a different building about 100 meters away, which is expected to provide more stable conditions for keeping the fuel cool.

The No. 4 spent fuel tank currently contains 1,331 spent fuel assemblies and 202 unused ones. The utility succeeded in taking out two unused fuel assemblies in a trial last year.

The challenging task will be carried out along with the ongoing fight to contain leaks of a massive amount of highly radioactive water accumulating at the plant as a result of continuing water injections into the crippled Nos. 1 to 3 reactors.

TEPCO said Wednesday that it detected 59,000 becquerels per liter of beta radiation, emitted by radioactive substances such as strontium, in water taken from a drainage channel near a storage tank that was found to have leaked 300 tons of highly toxic water in August.

The water sample, extracted the previous day, showed a record-high figure. To prevent the contaminated water inside the channel from flowing into the adjacent Pacific Ocean, TEPCO has placed sandbags at a downstream section.

October 30, 2013

LDP panel makes proposals for cleanup and dismantling

LDP panel seeks gov't funding to scrap reactors

http://www3.nhk.or.jp/nhkworld/english/news/20131030_29.html

Japan's governing Liberal Democratic Party has come up with a set of proposals to speed up the recovery from the Fukushima Daiichi nuclear accident.

An LDP panel tasked with speeding up reconstruction efforts after the March 2011 earthquake and tsunami worked out the proposals.

The panel pledges maximum efforts by the central and local governments, Tokyo Electric Power Company and others to revive Fukushima Prefecture.

To this end, the panel proposes downsizing and integrating the government task force on nuclear disaster management to give more authority to teams in charge of reactor decommissioning and wastewater control.

The panel also calls for a quick decision on who would scrap the reactors, taking into consideration various possibilities such as spinning off TEPCO's decommissioning division as a subsidiary.

The panel urges the government to ensure safety when building and managing storage facilities for radioactive soil.

It also wants the government to commit to taking the initiative in scrapping the reactors and controlling contaminated wastewater.

The panel says the government will be able to provide funds for such decontamination, reactor decommissioning and wastewater control efforts when they are needed.

In addition, the panel calls for extending the statute of limitations on the Fukushima nuclear accident so that those affected will not lose their right to seek damages.

The LDP plans to submit the proposals to the government shortly, after consulting with its coalition partner New Komeito.

November 2, 2013

TEPCO to set "in-house company" for decommissioning

TEPCO considering 'in-house company' for Fukushima decommissioning

http://mainichi.jp/english/english/newsselect/news/20131102p2g00m0dm064000c.html

TOKYO (Kyodo) -- Tokyo Electric Power Co. is considering setting up an "in-house company" to deal with decommissioning the disaster-hit Fukushima Daiichi nuclear power plant, sources close to the issue said Saturday.

The in-house company will be separated from TEPCO's nuclear sector to make its mission and responsibilities for addressing challenges related to the crippled plant, including the leak of contaminated water, clear, according to the sources.

The utility introduced the in-house company system in April, and the decommissioning unit will become one of several such units, which have so far handled energy transmission and distribution among other fields.

TEPCO will discuss the plan with the government so that it can incorporate it into its comprehensive business strategy.
Some lawmakers, however, may require TEPCO to spin the unit off into a completely independent affiliated company.

November 7, 2013

The start of a very long process

Fukushima decommission at starting line

http://www3.nhk.or.jp/nhkworld/english/news/20131107_03.html

The operator of the damaged Fukushima Daiichi plant is preparing to take a key step towards decommissioning the nuclear reactors. It will start in mid-November to remove more than 1,500 fuel rods from one cooling pool.

The operation is the start of a long process expected to take 30 to 40 years.

Tokyo Electric Power Company personnel will begin at reactor no. 4. Its pool stores 1533 fuel units, most of which are highly radioactive spent rods.

TEPCO will also need to clear rods from pools at 3 other reactors in a worse state. Reactor no. 1's pool has 392 units, no. 2 has 615, and No. 3 has 566.

TEPCO officials hope to begin removing rods from those pools in about 2 years. They have been hampered by intense radiation and problems like inflow of rainwater.

They're anticipating a bigger challenge in removing molten fuel from reactor containers. TEPCO hopes to start that stage in 2020.

Workers are prevented by high radioactivity from fully studying the reactor interiors. They are attempting to use remote-control cameras.

TEPCO officials are seeking international cooperation to develop a machine that can remove the molten fuel, an operation never tried before.

The company is also facing other challenges including radioactive-water leakage into the sea and **a lack of sufficient skilled workers.**

November 14, 2013

NHK video: US Expert on Decommissioning

Nuclear Watch: US Expert on Decommissioning

http://www3.nhk.or.jp/nhkworld/newsline/201311142119.html

Lake Barrett, an American expert, former director of the US nuclear watchdog who has worked on the decommissioning of the Three Mile Island plant, talks about TEPCO's task ahead.

Although he sees no technical problem so far (with the removal of fuel rods), he insists that TEPCO has to establish a relationship with the local population and the public in general. **Restoring trust** is an essential part of success.
"The importance of transparency every step of the way " cannot be emphasised enough.

November 18, 2013

No disposal site for waste - No decommissioning of Tokai reactor

Nuclear power plants in disarray: Lack of waste burial site to delay Tokai reactor decommissioning

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201311180084

Work to decommission the nation's first commercial nuclear reactor cannot start for the simple reason there is still no disposal site for radioactive waste.
Japan Atomic Power Co. looks set yet again to postpone dismantling of the reactor of the Tokai nuclear power plant in Ibaraki Prefecture, sources said. The task was originally scheduled for fiscal 2011 and then put off until fiscal 2014.
"It will be difficult to begin dismantling the reactor next fiscal year," a source said.
The plant started operations in 1966 and was shut down in 1998. It is the first commercial reactor slated for decommissioning in Japan.
Decommissioning will generate 27,800 tons of low-level radioactive waste. Of that, 1,600 tons, such as control rods and reactor components, must be buried at a depth of 50 to 100 meters.
Under the plan approved by the industry ministry in 2006, the reactor was to be dismantled over six years from fiscal 2011. The cost of decommissioning was estimated at 88.5 billion yen ($883 million).
No disposal site has since been selected. The Nuclear Regulation Authority has yet to set safety standards for a disposal site, citing the absence of such a facility.

The government is weighing the feasibility of building a disposal site in Rokkasho, Aomori Prefecture, where Japan Nuclear Fuel Ltd., set up by electric utilities, is building a spent nuclear fuel reprocessing plant.

The company started a study on the disposal of radioactive waste from decommissioning in 2002, building a facility 100 meters under the ground on the site.

The study has been taken over by the Radioactive Waste Management Funding and Research Center, affiliated with the industry ministry.

Still, officials of both Rokkasho village and Aomori Prefecture said they have no intention of accepting any radioactive waste.

Before the triple meltdown at the Fukushima No. 1 nuclear plant in 2011, the government estimated that 50,000 tons of radioactive waste to be buried underground would be generated from decommissioning and other work by 2030.

The amount is expected to increase, however.

Tokyo Electric Power Co. has decided to decommission four crippled reactors at the Fukushima No. 1 plant and is also considering decommissioning the remaining two.

The nuclear reactor regulation law, revised after the Fukushima disaster, limits the operating life of a reactor to 40 years, in principle.

An industry ministry official said 15 reactors that began operations at least 30 years ago are expected to be decommissioned in the years to come.

Japan has yet to find a burial site also for high-level radioactive waste from planned reprocessing of spent nuclear fuel from power plants, a point underlined by former Prime Minister Junichiro Koizumi in his call for a nuclear phase-out.

The Nuclear Waste Management Organization, affiliated with the industry ministry, solicited municipalities that would host a final disposal facility for radioactive waste in 2002.

The town of Toyo in Kochi Prefecture was the only one willing to accept the facility, but the town government soon retracted its offer in the face of opposition from residents.

The government plans to reprocess all spent nuclear fuel from power plants for recycling, but the completion of the Rokkasho reprocessing plant has suffered repeated delays.

Nuclear plants around the country are holding a combined 17,000 tons of spent nuclear fuel in storage pools, and many pools are expected to be filled up within several years.

Hiroyuki Hosoda, chief of a group of pro-nuclear lawmakers, has countered Koizumi’s argument, suggesting a rotation system under which electric utilities will store spent nuclear fuel at new facilities in their nuclear plants for several years by turns.

"Koizumi said a final disposal facility is the faintest dream, but nuclear power plants have many 'inermediate storage facilities' (for spent nuclear fuel)," Hosoda told a meeting of the group on Nov. 7. “We could explore the possiblity of transferring (storage areas) under several-year agreements."

Leaders of local governments hosting nuclear plants were wary of such ideas even before Hosoda, a Liberal Democratic Party lawmaker and former chief Cabinet secretary, outlined his proposal.

In the early stages of the Fukushima nuclear disaster, it was feared that a large amount of radioactive materials would be released if the No. 4 reactor pool lost water and nuclear fuel was exposed.

In April, Fukui Governor Issei Nishikawa called on Makoto Yagi, president of Kansai Electric Power Co., to secure intermediate storage facilities for spent nuclear fuel, citing urban areas, possibly Osaka, as candidate locations.

"We have accepted power generation, but we are under no obligation to accept intermediate storage or (final) disposal," he said. "We urge you to consider thermal power plants in electricity-consuming areas, among other locations."

In response, Kansai Electric created a task force in June and also set up a council to promote the project, headed by the president, the following month.

Fukui Prefecture hosts the electric utility's three nuclear plants, including one located in Mihama town.

However, Mihama Mayor Jitaro Yamaguchi acknowledged that it will be impossible to win the support from electricity-consuming areas for Nishikawa's proposal.

Kansai Electric has also assigned only four employees exclusively to the project, although the utility emphasizes company-wide efforts.

All of the nation's 50 nuclear reactors have been taken offline in the aftermath of the Fukushima nuclear disaster. Five utilities have applied to the NRA for safety screenings to restart 14 nuclear reactors. Screenings for some reactors are expected to be completed early next year.

(This article was compiled from reports by Shin Matsuura and Hideki Muroya.)

November 19, 2013

Safety must be top priority

Editorial: TEPCO must put safety above all else in Fukushima atomic fuel removal project

http://mainichi.jp/english/english/perspectives/news/20131119p2a00m0na021000c.html

Tokyo Electric Power Co. (TEPCO) has begun removing nuclear fuel assemblies from the spent fuel pool in the Fukushima No. 1 nuclear power plant's No. 4 reactor building. This marks the start of phase two of the program to decommission the plant's reactors, a process that began all the way back at the end of 2011 and is expected to take 30-40 years to complete. The fuel removal from the No. 4 spent fuel pool will be an important test case, and its outcome could shift the direction of the entire decommissioning process.

The fuel rods in the nuclear fuel assembly contain massive quantities of radioactive materials, and taking them out of the pool is risky. As such, **TEPCO must absolutely put safety above holding to their work schedule.** We also call on the Nuclear Regulation Authority (NRA) to keep a very close eye on TEPCO's progress and do as much as possible to prevent any trouble with the fuel removal.

At the time of writing, there were 1,533 fuel rods (1,331 of them used) in the No. 4 reactor building's spent fuel pool -- the most of any of the plant's six reactor buildings. The No. 4 reactor was shut down for regular maintenance when the March 2011 disasters hit, so there was no fuel in the core when the plant lost power. However, the reactor building was severely damaged when hydrogen flowing in from the No. 3 reactor building exploded. Workers have since reinforced the structure, but the upper part of the building, where the spent fuel pool is situated, is thought to be unstable still. It is absolutely necessary that the fuel in the pool be moved very quickly to a safe location.

In the removal operation, the fuel assemblies are lifted out of their frames by a crane steered by a human operator. The assembly is then shifted under water to a waiting container at the corner of the pool. Once the fuel is inside, the container is sealed and lifted out of the pool and transferred to a new holding pool about 100 meters away.

Under normal circumstances, the crane that moves the fuel assemblies is computer-operated, but the damage to the building means the crane has to be run manually. The removal of all the fuel in the No. 4 pool is expected to take about a year. Meanwhile, radiation levels in the chamber itself are very high, and both maintaining a skilled workforce to do the job and managing the radiation exposure of those workers will be real challenges. Also, a lot of debris from the hydrogen explosion fell into the pool, meaning there's a real risk that a damaged fuel assembly could break open and spill its toxic contents during the removal process.

TEPCO has developed contingency plans for earthquakes and in case the transfer container falls. To say that these plans are perfect would be too much, however, and a close watch must be kept on the removal operation.

The schedule for decommissioning the Fukushima No. 1 plant is divided into three phases, and the No. 4 reactor has reached the second of those. After the fuel has been removed from the No. 4 pool, TEPCO will move on to the pools atop the No. 1-3 reactors, and then extracting the melted reactor cores.

Radiation levels at the No. 4 building are, however, lower than at the No. 1-3 reactors, and there is as yet no final plan for getting the spent fuel out of the pools in those three buildings. The only option is to learn as much as possible about the operation and its pitfalls from the No. 4 pool.

TEPCO must also tackle the contaminated water problem at the Fukushima plant in parallel with the fuel removal operation. The utility has put together an emergency response plan to deal with the chain of "human error" mistakes that have plagued the plant. Also, in addition to increasing staff numbers, the company will build an eight-story rest facility to help keep worker morale up and a company kitchen that will be able to make 3,000 meals a day. These facilities, however, won't be finished until next fiscal year or later, and are no quick-fix to the morale problem at the plant.

The NRA has decided to evaluate TEPCO's countermeasures and also commence safety inspections of the No. 6 and 7 reactors at the utility's Kashiwazaki-Kariwa nuclear plant. The Fukushima plant must be the top priority. If a problem arises in Fukushima, Kashiwazaki-Kariwa inspections must be suspended and TEPCO must devote all its energies to finding a solution.

Unchartered territory

TEPCO takes on long, unprecedented mission in decommissioning nuke reactors

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201311190056

Workers at the Fukushima No. 1 nuclear power plant are in uncharted territory, facing the risk of damaging fuel rods and scattering radioactive materials during a yearlong mission to remove fuel from a storage pool strewn with debris.

On Nov. 18, Tokyo Electric Power Co., the plant operator, began removing fuel from the pool in the No. 4 reactor building, whose roof and walls were blown off in a hydrogen explosion in the early stages of the nuclear crisis set off by the 2011 earthquake and tsunami.

“We are confident (we can carry it through), but we will proceed with caution,” Noriyuki Imaizumi, acting general manager of TEPCO’s Nuclear Power and Plant Siting Division, said of the work under way at the No. 4 reactor building.

Under normal operating procedures, fuel-handling equipment automatically moves to the locations of fuel to be removed.

But in this case, workers have to visually check the locations because fuel units are not necessarily in their regular positions due to the hydrogen explosion.

Large pieces of rubble generated by the explosion have been cleared, but small fragments still remain in the water-filled pool.

On Nov. 18, workers using special equipment moved four fuel assemblies to a cask, a cylindrical container used for transportation, one at a time. Work was monitored through underwater cameras. Workers spent about 40 minutes to transfer each fuel assembly to the cask, slowly moving each unit about one centimeter per second.

After 22 fuel assemblies are in the cask, it will be transported to a common storage pool about 100 meters away. TEPCO said it will take until December 2014 to move all 1,533 fuel assemblies.

Six teams, each made up of six workers, will take turns doing the fuel removal work. Each team will work for up to two hours due to high radiation levels.

If nuclear fuel is damaged, radioactive materials could be released. Equipment will automatically stop when abnormal conditions are detected.

Radioactive materials could also escape if a cask is broken, for example, if a powerful quake hits while operations are in progress.

TEPCO said such an accident is unlikely due to the precautions it has taken, including the use of duplex cask-hoisting wires.

In addition, parts of the building under the pool have been reinforced with steel frames and concrete to improve quake resistance. Steel shielding has also been installed over the building.

Officials estimate that potential effects outside the plant premises would be limited in the event a cask breaks.
But workers would have to evacuate, depending on radioactivity levels. If work is suspended for an extended period, the decommissioning schedule will have to be reviewed.

"More than a few employees have expressed concern that the work may not proceed smoothly," said a senior official of Tokyo Power Technology Ltd., TEPCO's wholly owned subsidiary responsible for fuel removal.

The company used to change fuel at the plant before it was damaged by the Great East Japan Earthquake and tsunami. But until now, no one has experience in removing fuel from a debris-scattered pool.

Workers will have to wear three layers of gloves, made of cloth or vinyl, and a mask to protect against high radiation levels while carrying out their tasks. Workers complained that finger grips feel different from when they are without gloves and that it is difficult to breathe through a mask.

A man who has been working at the plant since before the disaster said he does not feel anything special about the current decommissioning work.

"Before the accident, it was a big deal if we dropped a pen in a storage pool," said the man, who now inspects radioactive water storage tanks and does other jobs. "Today, I do not feel the same way, although small debris fragments remain in the pool. I think my senses have become numb due to the extraordinary situation that has continued since the accident."

High radioactivity levels have prevented workers from entering areas of the No. 1 to No. 3 reactors, which went into meltdown in the early stages of the disaster. Removal of spent nuclear fuel in those three reactor buildings is expected to begin in 2015, at the earliest.

TEPCO hopes to start removing the melted fuel from the No. 1 to No. 3 reactors in fiscal 2020. Overall decommissioning work at the plant is expected to take 30 to 40 years.

November 20, 2013

Reactors 5 & 6 to be used as research facility for decommissioning plant

Reactors 5, 6 to be test units for scrapping plant

http://www.japantimes.co.jp/news/2013/11/20/national/reactors-5-6-to-be-test-units-for-scrapping-plant/#.UozftCewT9k

Kyodo

Tokyo Electric Power Co. plans to permanently idle the two reactors at the Fukushima No. 1 power plant that were unscathed in the 2011 catastrophe and use them as test platforms for ultimately removing the fuel in the three reactors that suffered core meltdowns, Tepco sources said Wednesday.

The decision was reached following a request by Prime Minister Shinzo Abe, who said in September that the utility should scrap reactors 5 and 6 and focus more on cleaning up the disaster.

But instead of dismantling the two units, they will be used as **a research facility to develop technologies for achieving the unprecedented task of removing the melted fuel from reactors 1, 2 and 3,** a process that will take decades.

Tepco will explain the plan to the prefectural and nearby local governments.

By accepting Abe's request, the cash-strapped utility is apparently seeking to win further state help for its decontamination costs outside the plant, which one estimate has shown could reach ¥5 trillion. Tepco's current estimate of the cost to scrap Fukushima No. 1 is around ¥2 trillion.

As new accounting rules regarding decommissioning went into force in October, Tepco is likely to avoid booking a large extraordinary charge in the business year through March due to a shortfall in decommissioning funds.

In the March 11, 2011, mega-quake and tsunami, the plant lost nearly all its power sources and consequently the ability to cool reactors 1, 2 and 3, and the spent fuel pools at reactors 1 through 4.

Reactors 1 through 3 suffered meltdowns and the building housing unit 4, which did not have fuel inside the core because it was under maintenance, was damaged by a hydrogen explosion.

But reactors 5 and 6, which were in "cold shutdown" mode while also under maintenance at the time the crisis hit, also briefly lost power but cold shutdown was re-established because an emergency diesel generator nearby managed to keep pumping coolant water into the units. That generator was situated at a higher level and thus was not knocked out by the tsunami.

2 more Fukushima reactors to be decommissioned

http://www3.nhk.or.jp/nhkworld/english/news/20131120_26.html

Tokyo Electric Power Company is planning to decommission the 2 reactors at its Fukushima Daiichi nuclear plant that were not seriously damaged in the March 2011 disaster.

TEPCO officials said they will first consult with officials in Fukushima Prefecture and in the towns of Futaba and Okuma. An official decision to decommission the Number 5 and 6 reactors could come next month.

TEPCO is already engaged in work related to decommissioning the 4 other reactors at the plant, which were severely damaged.

Prime Minister Shinzo Abe urged TEPCO in September to decommission the Number 5 and 6 reactors and concentrate on responding to problems caused by the March 2011 nuclear accident.

The utility plans to use facilities at the plant for training workers involved in decommissioning the 4 severely damaged reactors.

TEPCO is already organizing funding for decommissioning the other 2 reactors. But the company is expected to fall short by 267 million dollars if the official decision to decommission is made during the current fiscal year.

The utility is allowed to cover the shortfall by raising power rates.

November 22, 2013

NHK video: Fuel Removed under Cloud

http://www3.nhk.or.jp/nhkworld/newsline/201311222116.html

What to do about nuclear waste long term ?
Storing it at nuclear plants, everybody agrees, is “unsustainable”.

November 25, 2013

IAEA starts decommission review

IAEA starts review at Fukushima

http://www.japantimes.co.jp/news/2013/11/25/national/iaea-starts-review-at-fukushima-2/#.UpOj1SewT9k

Kyodo

A team of experts formed by the International Atomic Energy Agency began Monday reviewing Tokyo Electric Power Co.’s ongoing efforts to scrap the crippled reactors at its Fukushima No. 1 nuclear power plant.

The team will focus on the management of the radioactive water buildup at the site and fuel-removal work that has just started at a pool inside the damaged reactor 4 building, team leader Juan Carlos Lentijo told a press conference in Tokyo.

“The removal of the spent fuel is an essential activity toward decommissioning. Our idea is to review the full process that Tepco has developed for the purpose and all the precautions adopted to develop these activities in a safe way,” the director of the IAEA Division of Nuclear Fuel Cycle and Waste Technology said.

On Nov. 18, Tepco started a delicate mission to remove over 1,000 fuel assemblies from the spent fuel pool at reactor 4, nearly three years after the plant suffered meltdowns and hydrogen explosions in the early days of the nuclear crisis.
During the work through Friday, workers finished transferring the first batch of fuel rod assemblies, all unused ones, from the unit 4 spent fuel pool to another building with more stable storage conditions.

After the press conference, Lentijo held a meeting with officials of the government and Tepco and told them the successful commencement of the fuel removal was “promising” for subsequent activities, including the same operation that needs to be undertaken in three other crippled units.

The IAEA team, consisting of 19 members, will issue a preliminary report of its main findings at the end of the mission on Dec. 4, and a final version of the report in around two months’ time.

It is the second time that Japan has accepted an IAEA review mission on work toward decommissioning the reactors 1 to 4 at the Fukushima plant. The previous mission was carried out in April.

IAEA starts Fukushima decommission inspection

http://www3.nhk.or.jp/nhkworld/english/news/20131125_24.html

A team from the International Atomic Energy Agency is in Japan to inspect the decommissioning process at the Fukushima Daiichi nuclear plant. The team began its work in Tokyo on Monday.

The 19-member team includes experts in the decommissioning of reactors and radioactive substances. This is the second such mission by the IAEA team, after one in April.

Team leader Juan Carlos Lentijo spoke before starting the mission, which is scheduled to run until Wednesday of next week.
He said he wants to share with the world what the team learns from the Fukushima decommissioning. He said this time the team will focus on two issues.
One is what he calls the critical issue of radioactive water, and the other is the removal of nuclear fuel, an essential step in the decommissioning process.

The team has started to gather information from government officials in Tokyo and from the plant operator, Tokyo Electric Power Company.

It will visit the plant on Wednesday to confirm that the nuclear fuel is being safely removed from the number-4 reactor building.

After the team completes its inspection, it will submit to the Japanese government a report containing recommendations regarding the decommissioning process.

December 5, 2013

What sort of decommission agency for Fukushima?

Japan may set up UK-style decommission agency for Fukushima plant

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201312050080

REUTERS

Japan's ruling party could set up a British-style agency to shut down the wrecked Fukushima nuclear plant, taking control of a project now managed by the station's embattled operator, a senior party policymaker said on Dec. 5.

A huge earthquake and tsunami in March 2011 triggered three meltdowns at the Fukushima No. 1 nuclear power plant, the worst nuclear disaster since Chernobyl in 1986, and exposed a lack of preparation by Tokyo Electric Power Co., or TEPCO.

The company has floundered for much of the last 2-1/2 years in dealing with several problems at the site, including a series of leaks of radioactive water into the Pacific Ocean.

TEPCO has proceeded with initial decommissioning steps, including the tricky removal of spent fuel rod assemblies from a badly damaged reactor building. Dismantling the plant and decontaminating the nearby area is likely to take decades and cost tens of billions of dollars.

"It is likely that the government will eventually have to take responsibility" for the decommissioning, Tadamori Oshima, head of the Liberal Democratic Party's task force on disaster reconstruction, told Reuters.

While immediate decommissioning steps should be taken by TEPCO, a government oversight body should direct the utility, Oshima added, but gave no further details.

In Britain, the National Decommissioning Authority, a public body, is charged with managing the dismantling of the country's atomic power and research stations.

Oshima had pushed for a government agency to shut down the plant, but the LDP did not include this aggressive proposal in a November report on Fukushima.

TEPCO, de facto nationalized after 2011, is still responsible for the ambitious decommissioning of the plant as well as for paying compensation to evacuees and cleaning up affected areas.

A plan to set up a decommissioning agency is controversial as it would reduce TEPCO's responsibility and increase the burden on taxpayers.

Prime Minister Shinzo Abe has so far pledged half a billion dollars in government funds to help stem the flow of contaminated water at the plant after a highly radioactive water leak in August triggered international alarm.

Lawmakers from Abe's coalition recommended last month that the government step back from the most ambitious goals for the vast clean-up and begin telling evacuees the $30-billion exercise will miss a long-term radiation reduction goal set after the disaster.

Oshima suggested the government would informally relax the long-term target, set by the previous government, to decontaminate an area the size of Connecticut around the Fukushima plant to levels of 1 millisievert of radiation or less.

"After we bring ambient radiation (down) to between 5 to 10 millisieverts and complete the decontamination, we will take thorough measures to manage individuals' dosage and safeguard their health," he said. "But a new radiation target would be difficult to publish because it would create a big problem."

The International Atomic Energy Agency said recently that a radiation reading of up to 20 millisieverts was acceptable by world standards.

Radiation levels in the area vary greatly. For example, Tomioka, a township about 12 km south of the Fukushima No. 1 plant, had ambient radiation ranging from 1 to 50 millisieverts by March.

About a third of the 160,000 people forced to flee when the earthquake and tsunami triggered a triple meltdown at the Fukushima plant remain in flimsy temporary housing.

December 12, 2013

Decommission Fukushima Daini too?

Tomioka seeks decommissioning of Fukushima Daini

http://www3.nhk.or.jp/nhkworld/english/news/20131211_43.html

The assembly of Tomioka Town in Fukushima Prefecture has approved a petition calling for the decommissioning of the Fukushima Daini nuclear plant.

The plant, some 10 kilometers from the Fukushima Daiichi plant, has been off-line since the meltdown.

Number 3 and 4 reactors of the Daini plant fall within the boundaries of Tomioka Town.

The petition adopted by a majority vote on Wednesday says it's highly unlikely the community will accept the plant's restart now the national nuclear policy has been called into question.

Fukushima Prefecture has already adopted petitions calling for scrapping all nuclear reactors in the prefecture.

But this is the first time such a petition has been approved by a township assembly in Fukushima.

December 15, 2013

Not enough Japanese decommissioning expertise

Japan lacks decommissioning experts for Fukushima

http://mainichi.jp/english/english/newsselect/news/20131215p2g00m0dm043000c.html

In this Wednesday, Sept. 25, 2013 photo released by the International Research Institute for Nuclear Decommissioning, members of International Expert Group (IEG) confer with a Tokyo Electric Power Co. official, center, as they inspect the decommissioning progress near the Unit 1 building at the crippled Fukushima No. 1 Nuclear Power Plant in Okuma, Fukushima Prefecture, during the first IEG meeting held from Sept. 23 - 27. (AP Photo/The International Research Institute for Nuclear Decommissioning)

TOKYO (AP) -- Japan is incapable of safely decommissioning the devastated Fukushima nuclear plant alone and must stitch together an international team for the massive undertaking, experts say, but has made only halting progress in that direction.

Unlike the U.S. and some European countries, Japan has never decommissioned a full-fledged reactor. Now it must do so at the Fukushima Dai-Ichi plant. Three of its six reactors melted down after the 2011 earthquake and tsunami, making what is ordinarily a technically challenging operation even more complex.

The cloud over Japan's capacity to get the decades-long job done has further undermined the image of the nuclear industry with the public. Opinion surveys show a majority of Japanese are opposed to restarting 50 reactors that were put offline for safety and other checks in the aftermath of the disaster. Japan has been forced to import oil and gas to meet its power needs, burdening its already feeble economy.

"Even for the U.S. nuclear industry, such a cleanup and decommissioning would be a great challenge," said Akira Tokuhiro, a University of Idaho professor of mechanical and nuclear engineering who is among those calling for a larger international role at Fukushima.

Decommissioning a nuclear power plant normally involves first bringing the reactor cores to stable shutdown, and then eventually removing them for long-term storage. It is a process that takes years. Throughout, radiation levels and worker exposure must be monitored.

At Fukushima, there is the daunting challenge of taking out cores that suffered meltdown, which is the most dangerous type of nuclear power accident. Their exact location within the reactor units isn't known and needs to be ascertained so their condition can be analyzed. That will require development of nimble robots capable of withstanding high radiation.
The lack of experts is worse at the regulatory level. The tally is zero.

Japan's Nuclear Regulation Authority has no one devoted to decommissioning, said spokesman Juntaro Yamada, though it has experts dealing with the ongoing removal of fuel rods from one of the Fukushima reactor units.
Its predecessor organization was criticized after the Fukushima disaster for being too close to the nuclear industry, so the members chosen for the new agency launched last year don't have direct ties to the industry to ensure their objectivity.
The government-funded Nuclear Energy Safety Organization, which is to be folded into the regulatory authority to beef up its expertise, has one expert on decommissioning, a person who studies overseas regulations on the process. The group mainly helps with routine nuclear plant inspections, but since the 2011 catastrophe has been involved with bringing the Fukushima plant under control.

In contrast, the U.S. Nuclear Regulatory Commission has 10 people devoted to decommissioning including four project managers, four health physicists, and a hydro-geologist. It says it has the equivalent of more than 200 years of experience in decommissioning and has overseen the termination of 11 power reactors and 13 research reactors.

France has decommissioned nine reactors, and its regulatory agency has seven decommissioning experts at the national level, and 10 more at the local level.

Lake Barrett, a retired nuclear engineer who took part in decommissioning Pennsylvania's Three Mile Island after the meltdown of its reactor core in 1979, was hired as a consultant by Fukushima operator Tokyo Electric Power Co. He visits about once a year or so to give advice, and is not assigned daily to the job.

The cleanup at Fukushima would be more difficult than Three Mile Island because the damage is more numerous, involving three reactors instead of one, and more serious because of the greater damage from the bigger explosions.
Barrett said one reason he wanted to help Fukushima was that Japanese engineers had helped out at Three Mile Island. He had asked about their whereabouts but got no answers. He fears they are all retired or working in other industries.

"The most challenging area is skilled nuclear engineers and managers that can plan, integrate and communicate effectively in Japanese," he said.

Japan's nuclear program started later than the U.S. and it has scrapped only a small test reactor. Five reactors are in various stages of decommissioning, including two experimental reactors and three commercial ones.

The furthest along is Tokai Power Station's No. 1 reactor, which is 15 years into a planned 22-year process. About 70 experts are working on the decommissioning, but the experience gained with Japan's oldest reactor is not directly transferable to Fukushima.

The decommissioning of two reactors similar to Fukushima's began in 2009 at Hamaoka nuclear power plant west of Tokyo, but it is in the early stages and is expected to take nearly 30 more years.

It took until August this year, nearly two and half years after the tsunami, for Japan to set up the International Research Institute for Nuclear Decommissioning, to bring together ideas, both inside and outside Japan, on Fukushima decommissioning and encourage communication.

Tokuhiro, who has more than 20 years in the nuclear design and safety fields, calls it a step in the right direction but too small, given the huge task at hand. The organization acknowledges much remains to be done, including responding to unprecedented challenges that will require the development of robotics and other new technology.

Tokuhiro is advocating the creation of an international team to help Japan, including those with experience at Three Mile Island and Chernobyl in the Ukraine.

"It is clear that this very large undertaking requires an international effort," he said. "It is in the spirit of a global nuclear energy partnership

December 17, 2013

Japan looking for melted fuel removal technologies

Govt. seeking fuel retrieval technologies

http://www3.nhk.or.jp/nhkworld/english/news/20131218_18.html

The Japanese government on Wednesday began to publicly solicit information on technologies that can safely remove nuclear fuel debris from the crippled Fukushima Daiichi plant.

In 2020 or later, Japan plans to start removing the melted fuel from the 3 reactors that suffered meltdowns in the March 2011 disaster.

The removal of the fuel debris is a core part of the work to decommission the plant, which will reportedly take 30 to 40 years.

On Tuesday, the International Research Institute for Nuclear Decommissioning, or IRID, explained the current plan to some 130 engineers and researchers at a briefing session in Tokyo.
The plan is to fill the reactor containment vessels with water to minimize workers' exposure to radiation.

Institute officials said they are seeking information on ways to examine the condition of the melted fuel inside the reactors and containment vessels, which have complicated structures. They are also asking for ideas on ways to remove the fuel by remote control.

IRID managing director Kazuhiro Suzuki said he believes there are numerous technologies in the world that can be applied to this project.

Proposals will be accepted at the IRID website through January 31st. The web address is: http://irid.or.jp/

Submission procedures are explained in both English and Japanese.

December 18, 2013

Japan can't do it alone - Please help

Japan lacks decommissioning experts for Fukushima No. 1 - International team needed, the sooner the better: experts

http://www.japantimes.co.jp/news/2013/12/18/national/japan-lacks-decommissioning-experts-for-fukushima-no-1/#.UrId7Sfij9n

by Yuri Kageyama

AP
Japan is incapable of safely decommissioning the devastated Fukushima No. 1 nuclear plant alone and must stitch together an international team for the massive undertaking, experts say.

However, only halting progress has been made so far.

Unlike the United States and some European countries, Japan has never decommissioned a full-fledged reactor. Now it must do so at Fukushima No. 1. When the reactors melted down after the 2011 earthquake and tsunami, what is ordinarily a technically challenging operation became much more complex.

The cloud over Japan's capacity to get the decades-long job done has further undermined the image of the nuclear industry with the public. Opinion surveys show a majority of people are opposed to

restarting the 50 reactors that were put offline for safety and other checks since the disaster started. The nation has been forced to import oil and gas to meet its power needs, burdening an already feeble economy.

"Even for the U.S. nuclear industry, such a cleanup and decommissioning would be a great challenge," said Akira Tokuhiro, a University of Idaho professor of mechanical and nuclear engineering who is among those calling for a larger international role at the Fukushima facility.

Decommissioning a nuclear power plant normally involves first bringing the reactor cores to stable shutdown, and then eventually removing them for long-term storage. It is a process that takes years. Throughout, radiation levels and worker exposure must be monitored.

At Fukushima No. 1, there is the daunting challenge of taking out cores that suffered meltdown, which is the most dangerous type of nuclear power damage. The exact location of the melted fuel within the reactor units isn't known and needs to be ascertained so their condition can be analyzed. That will require development of nimble robots capable of withstanding high radiation.

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See also : http://fukushima-is-still-news.over-blog.com/article-not-enough-japanese-decommissioning-expertise-121614336.html

December 20, 2013

Oldest reactor's (Tokai) decommissioning rescheduled again

Tokai nuclear power plant's decommissioning delayed 2nd time

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201312200057

By AKIRA HATANO/ Staff Writer

Japan Atomic Power Co. has postponed the decommissioning completion date of the nation's oldest nuclear reactor by five years, citing issues with equipment to move radioactive waste and the lack of a disposal site for the materials.

The company said Dec. 19 that it would finish decommissioning the Tokai plant in Ibaraki Prefecture by fiscal 2025. It is the second time decommissioning work has been rescheduled.

The single-reactor plant went into service in 1966 as Japan's first commercial reactor and was closed down in 1998. Its reactor is the nation's first to be dismantled.

Japan Atomic Power told the Nuclear Regulation Authority that its decision to reschedule the decommissioning work was due to a delay in the design of the equipment.

The equipment is supposed to move out a total 1,600 tons of low-level radioactive waste from the reactor building.
The waste, including control rods and graphite moderator, must be buried 50-100 meters below the ground for safe disposal.

However, the disposal site has yet to be decided.

Japan Atomic Power initially expected to begin the six-year decommissioning process in fiscal 2011 under the plan approved in 2006 by the industry ministry.

But the company announced in 2010 that the process would not start until fiscal 2014, citing a delay in the design of this equipment.

January 3, 2014

Fukushima holds news conference on decommissioning

Panel to plan Fukushima plant decommissioning, rebuilding of local area

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201401030027

FUKUSHIMA--The deputy industry minister said he will set up a special study group this month to advise him on how to map out a long-term strategy for decommissioning the reactors at the crippled Fukushima No. 1 nuclear power plant and rebuilding local industry.

Kazuyoshi Akaba, who is also the chief of the government's task force handling the Fukushima nuclear disaster, made the announcement at a news conference in the city of Fukushima on Dec. 30.
He called for the decommissioning to be seen as an economic opportunity that should be used to facilitate the return of those evacuees displaced by the meltdown at the plant.

"It's a given fact that we need to create employment opportunities by building the industry there to enable evacuees to be able to return to their homes," he told the news conference.

Local leaders and experts will make up the study group. It will meet once a month and present its proposals in June.

The study group also plans to tour the Hanford Site in Richland, Wash., where plutonium was processed. Members hope to draw lessons from the decommissioning of reactors there, which is currently under way.

The group will take up a range of issues such as establishing a research center that will focus on the decommissioning and decontamination operations at the Fukushima plant; how to best incorporate robotics into the process, including the cleanup effort; and devise ways to attract businesses to the area and improve infrastructure after evacuees are given the go-ahead to return home.

Members include Masao Uchibori, vice governor of Fukushima Prefecture, and Yoshiyuki Ishizaki, who represents the Fukushima Revitalization Headquarters for Tokyo Electric Power Co., operator of the crippled nuclear plant. Local leaders from the Futaba region, including municipalities hosting the plant, as well as the president of the University of Aizu, will also join.

January 10, 2013

Decommissioning and compensation in same fund

In policy shift, decommissioning unit to join Fukushima compensation fund

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201401100076

To accelerate work at the crippled Fukushima nuclear plant, the industry ministry plans to place a new decommissioning division within the government-backed fund responsible for compensating victims of the disaster.

The plan has already produced some puzzled looks.

"I was surprised when I heard (about it) from an official of the industry ministry's Agency for Natural Resources and Energy at the end of last year," said Hajimu Yamana, who is expected to lead the new division. "Compensation and decommissioning are two different worlds."

The plan is part of the Abe administration's decision to play a greater role in decommissioning, controlling radioactive water at the Fukushima No. 1 nuclear plant, and cleaning up areas contaminated by radioactive fallout.

Previously, these issues were left entirely in the hands of Tokyo Electric Power Co., operator of the plant that experienced a triple meltdown after the March 2011 Great East Japan Earthquake and tsunami.

Under the plan, a division in charge of decommissioning will be set up within the Nuclear Damage Liability Facilitation Fund (NDLFF) by absorbing the International Research Institute for Nuclear Decommissioning (IRID), sources said.

The IRID, currently headed by Yamana, is an association of electric power companies and nuclear reactor manufacturers. It was organized under a government initiative last summer to develop technologies required for decommissioning the Fukushima No. 1 plant.

The new division will be established as early as in fiscal 2014 after revisions are made to the law governing the NDLFF, the sources said. Related bills will be submitted to the ordinary Diet session that convenes this month.

The new division, consisting of dozens of experts, will be responsible for technological development. It will also oversee TEPCO's decommissioning work and order improvements when problems arise, the sources said.

Yamana said Japan should instead create a public agency tasked with decommissioning, modeled after Britain's Nuclear Decommissioning Authority, and provide the technology, fund and responsibility required for its mission.

"If the IRID's founding scores 20 out of 100, the merger with the NDFFL marks 45," he said. "A positive development is that (the new division) will be able to hire decommissioning experts and supervise TEPCO's work."

The decommissioning of the Fukushima plant is expected to take decades. Yamana said Japan should draw up an overall plan within a few years and build a framework for mobilizing technology, fund and personnel.

"The coming several years are crucial," he said. "If we crawl along as we have done, radioactive contamination will spread to groundwater and the sea. We have to pick up our pace."

Even some industry ministry bureaucrats are critical of the proposed marriage between the IRID and the NDFFL, describing the two partners as an unmatched couple.

A senior official said the ministry is prepared to "redesign the framework" if the realignment fails to work.

The industry ministry long maintained that TEPCO is legally responsible for decommissioning, although some experts said Japan should create a specialist agency based on the British model.

TEPCO has failed to make progress in decommissioning the reactors and dealing with leaks of radioactive water at the plant. The government has decided to commit its own resources in line with a ruling coalition proposal submitted in autumn last year.

Yamana said Japan must first develop a technology strategy for decommissioning and then determine an organizational setup and the amount of money needed to carry out that strategy.

"(However,) discussions always start from a bureaucratic organization and a budget in Japan," he said, adding that the government apparently decided to use the NDLFF as a platform to secure an organization and funding for decommissioning.
(Yasuaki Oshika contributed to this article.)

January 12, 2014

Foreign advice on decommissioning

Foreign experts to advise Fukushima dismantling

http://www3.nhk.or.jp/nhkworld/english/news/20140113_01.html

A Japanese research institute on nuclear decommissioning will ask 3 non-Japanese experts for advice on scrapping reactors at the Fukushima Daiichi nuclear plant. It's been nearly 3 years since the March

2011 earthquake and tsunami caused nuclear meltdowns.

The International Research Institute for Nuclear Decommissioning was set up last year to support the government in dismantling the crippled reactors.

It is comprised of Tokyo Electric Power Company, which is the operator of the Fukushima Daiichi, and other utilities, as well as makers of nuclear plant equipment.

The organization has been soliciting technological assistance in Japan and abroad.

The 3 foreign advisors include Luis Echavarri, the Director-General of the Organization for Economic Cooperation and Development's Nuclear Energy Agency.

Echavarri says a clear plan should be drawn up and that the decommissioning process should be transparent.

The OECD official proposed a multi-year budget for the work, given the amount of time required for technological development. He says a single-year budgeting framework would be extremely difficult.

Under the present plan, removing nuclear fuel debris from the reactors will start as early as in the first half of 2020.

How that will be done is yet to be decided as not much is known about the exact state of the damaged fuel that will require sophisticated technologies to remove.

January 17, 2014

"Iron-hearted" manager for Fukushima Daiichi decommissioning

'Iron-hearted' manager in charge of ending Fukushima nuclear crisis

http://ajw.asahi.com/article/behind_news/people/AJ201401170010

By YASUAKI OSHIKA/ Staff Writer

Nuclear plant manager **Naohiro Masuda** developed such a fearsome reputation that his subordinates called him “iron-hearted.”

But he is also known as a boss who gets things done, and this may be the reason he was put in charge of the enormous task of decommissioning the crippled Fukushima No. 1 nuclear power plant and ending the contaminated water problem there.

His work will start in April.

“Many local residents still cannot return to their homes,” Masuda, 55, said. “I will be fully committed to solve the problem at the site where the real work is being done.”

Masuda was the manager of the Fukushima No. 2 nuclear power plant when the Great East Japan Earthquake struck on March 11, 2011, spawning a tsunami that caused the triple meltdown at the No. 1 plant.

The waves also swamped the No. 2 plant. Some workers there couldn't contact family members or learned that their homes had been washed away.

Masuda yelled at his subordinates not to be distracted by the disaster. "Recite what you should do," he told them while giving precise instructions.

He also told those who wanted to go home to hold on a little longer.

"I thought the workers' morale would break down if some of their colleagues were allowed to leave the site," Masuda said, looking back on his actions.

Using his memory of blueprints and personnel arrangements, Masuda gave rapid-fire orders to his workers in the wake of the disaster. The external power source at the No. 2 plant was still functional, and it restored the plant's cooling system to avert a nuclear crisis.

Masuda and his strict management style have been compared to Masao Yoshida, the former chief of the No. 1 plant who had endeared himself to his subordinates. The two plant managers were called "warm-hearted Yoshida and iron-hearted Masuda."

Yoshida died last year of esophageal cancer.

Masuda has worked three times at the Fukushima No. 2 plant, including his initial years with Tokyo Electric Power Co., the operator of the Fukushima nuclear plants.

He has spent about half of his career at nuclear plants and accumulated experience as "a builder" in charge of nuclear power plant construction.

He cited "a decline of on-site capabilities" behind the disaster at the No. 1 plant.

The Fukushima nuclear crisis is far from over, and radioactive water continues to leak at the site. Decommissioning the reactors is expected to take more than 30 years to complete.

Masuda will live in the familiar prefecture again, leading about 4,000 workers tasked with ending Japan's worst-ever nuclear accident.

February 2, 2014

The Telegraph on decommissioning Fukushima

UK nuclear experts to help decommission Fukushima - Engineers from Sellafield to travel to Japan to advise on shutting down the stricken site

http://www.telegraph.co.uk/finance/newsbysector/energy/10613243/UK-nuclear-experts-to-help-decommision-Fukushima.html

Government officials and nuclear experts inspecting a construction site at Fukushima in August Photo: AFP/GETTY IMAGES

By Louise Armitstead

British nuclear experts are being lined up to help decommission the damaged Fukushima power plant in a move that could reboot Japan's atomic power capabilities.

Lady Judge, the British-American nuclear expert and adviser at Fukushima, is organising for engineers from Sellafield in Cumbria to travel to Japan to advise on decontaminating and shutting down the stricken site.

"At Sellafield and Dounreay we are decommissioning big power plants and we can provide a very good example to the Japanese of how to do it safely," said Lady Judge in an interview with The Telegraph. "I've been talking to Sellafield about sending some engineers to help."

The Tokyo Electric Power Company (Tepco), which owns the Fukushima plants, is planning to launch a new subsidiary for decommissioning and decontamination on April 1. The division is expected to be headed by a Japanese nuclear expert who is expected to be advised by British engineers.

On Friday, Sellafield ordered all non-essential staff to stay at home after elevated readings of radiation were detected on site. Later officials at Sellafield – the site of Britain's worst nuclear accident in 1957 – said naturally occurring radioactive gas that comes from rocks and soil, had triggered the alarm.

"A lot of knowledge will go between Japan and the UK," said Lady Judge. "Helping the Japanese, will also help the Brits. We will benefit from working in Japan, the nuclear industry will benefit, and R&D will flourish in both countries."

The move would reverse the roles in the UK where Japanese companies, including Toshiba and Hitachi, are leading the plans, alongside France's EDF Energy, to build the first nuclear power stations in Britain for decades. Three weeks ago Japan's Toshiba agreed to buy a 60pc stake in NuGeneration, the UK nuclear venture that plans to build three new plants at the Moorside site in West Cumbria.

Lady Judge said that while Britain has lost most of its nuclear building expertise, the country still a world leader in decommissioning. Lady Judge was chairman of the UK Atomic Energy Authority (UKAEA) from 2002 to 2010 which at the time was focused on decommissioning.

Almost 18 months ago, she was asked to join a new international oversight board being put together at the Tepco and appointed as deputy chairman of Tepco's Nuclear Reform Monitoring Committee, where she is in charge of safety.

The company is desperate to rebuild trust with the Japanese public which is still highly suspicious of nuclear power. The earthquake and tsunami that struck the Daiichi plant in March 2011 caused the worst nuclear accident since Chernobyl. Most of Japan's nuclear power plants remain closed in the wake of the disaster, despite the crippling costs of importing oil and gas.

Last week, Japan reported a record trade deficit of 11.5 trillion yen, up 65pc from a year ago, due to soaring energy costs. The country, which recorded trade surpluses every year between 1980 and 2010, relied on its nuclear power plants for most of its supplies. High energy costs also helped Japanese consumer prices rise at their fastest pace for five years, according to data out on Friday.

Tepco, which has been heavily criticised for its handling of Fukushima, is hoping that Lady Judge and the rest of the committee can help safely shut down Fukushima and pave the way for Japan's nuclear plants to restart.

March 4, 2014

Decommissioning Fukushima not quite so obvious

Technology and working conditions for decommissioning process still lacking

http://mainichi.jp/english/english/newsselect/news/20140304p2a00m0na012000c.html

Fukushima No. 1 Nuclear Power Plant (above) on March 12, 2011, the day after it was struck by a massive earthquake and tsunami, and the same plant on Feb. 17, 2014. (Mainichi)

Workers at the Fukushima No. 1 Nuclear Power Plant began removing spent nuclear fuel rods from the No. 4 reactor's cooling pool in November 2013. But spent fuel in reactors No. 1, 2 and 3 has remained untouched, and we still lack technology that can withstand high levels of radiation in the decommissioning process. Considering this is a major undertaking that will take up to 40 years, we have barely taken the first step.

A decommissioning roadmap compiled by the government and Fukushima plant operator Tokyo Electric Power Co. (TEPCO) defines the period until removal of spent fuel rods is begun as period 1; the period until the removal of molten fuel in reactors No. 1-3 as period 2; and the period in which molten fuel removal is completed and the reactor buildings are dismantled as period 3.

Of the 1,533 spent fuel rods that were in the cooling pool of the No. 4 reactor, about one-fourth or 418 rods had been extracted as of March 3. The majority of the fuel rods have remained intact, and TEPCO plans to remove all of them before the end of the year.

The biggest hurdle TEPCO faces is the removal of molten fuel in the No. 1-3 reactors. Effects of the March 11, 2011 tsunami left the three reactors without their cooling capacity, and temperatures in the reactor containment vessels rose at one point to at least 2,000 degrees Celsius. The majority of the reactors' 1,496 fuel rods are believed to have melted.

To remove the fuel, the containment vessels must be filled with water to block radiation. To do so, however, it is essential that working conditions are improved, damage to the vessels is identified and repaired, and more advanced technologies are developed.

If all goes smoothly, fuel extraction will begin in the No. 1 and 2 reactors in fiscal 2020, and in the No. 3 reactor in fiscal 2021. With the Summer Olympics set to be held in Tokyo in 2020, it will be up to the government to prove both domestically and internationally that we are headed toward decommissioning. There are a total 1,573 spent fuel rods in the three reactors' cooling pools, and removal will begin in fiscal 2015 for the No. 3 reactor, and in fiscal 2017 for the No. 1 and 2 reactors at the earliest.

Meanwhile, TEPCO decommissioned the No. 5 and No. 6 reactors on Jan. 31 this year at the behest of the government. The two reactors will hereafter be used as model reactors for decommissioning the No. 1, 2, 3 and 4 reactors. According to Japan Atomic Industrial Forum President Takuya Hattori, the No. 5 reactor is the same type of reactor as the No. 1-4 reactors, and using it for practice could help cut back on the time it takes to decommission the others.

However, it is unclear whether the quantity and quality necessary for upcoming work at the nuclear plant can be maintained. TEPCO calculates that radiation exposure levels among workers by the time spent fuel extraction from the No. 4 reactor's cooling pool is completed will be a maximum 32 millisieverts per person. While the figure falls below the maximum permitted figure of 50 millisieverts per year and 100 millisieverts within a five-year period, radiation levels at reactors No. 1-3 is high, and the success of the decommissioning process relies heavily on whether TEPCO can continue to secure technical staff and other workers.

"From the standpoint of the entire decommissioning process, we are now standing at the foot of the mountain range, where we cannot see the mountaintop. There are going to be steep slopes and drop-offs waiting up ahead, such as the removal of molten fuel," says Nagoya University professor Akio Yamamoto, who was involved in the creation of Japan's new nuclear safety standards. "Those on the ground face excessive burdens, including dealing with contaminated water. We urgently need to improve compensation for workers."

March 8, 2014

Decommissioning: Profitable prospect for Japan

Cash cow born in No. 1 cleanup - Japan aims to carve a reactor decommissioning business out of disaster that irradiated Fukushima

http://www.japantimes.co.jp/news/2014/03/08/business/cash-cow-born-in-no-1-cleanup/#.UxtKNIXrV1s

by Mari Yamaguchi

AP

There is something surprising in the radioactive wreck that is the Fukushima No. 1 nuclear plant: opportunity. To clean it up, Japan will have to develop technologies and expertise that any nation with a nuclear reactor will one day need.

With dozens of aging reactors at home and hundreds of others worldwide that eventually need to be retired, Japanese industry sees a profitable market for decommissioning expertise.

It may sound jarring, given all the ongoing problems with Fukushima No. 1, including massive leaks of contaminated water and other mishaps that followed its devastation by the March 2011 earthquake and tsunami.

But many experts and industry officials say the experience and technology being developed, such as robotics, can be used in any future decommissioning project. That could represent new opportunities for Japan Inc., which has lost some of its global luster, notably to competitors from South Korea, China and the United States.

"There is decommissioning business here beyond Fukushima and it's a worldwide business," said Lake Barrett, a former U.S. nuclear regulator who headed the cleanup of the 1979 Three Mile Island incident.

"I think it's an exciting new area," he said. "Japan can be a world leader again."

Prime Minister Shinzo Abe's government hopes an offshoot will be a boom in nuclear technology exports.
uesday marks the third anniversary of the Great East Japan Earthquake and tsunami that triggered the Fukushima nuclear meltdowns, killed 15,884 people and left 2,636 unaccounted for in vast swaths of the northeast coast.

The country has struggled to rebuild Tohoku's shattered communities and to clean up radiation from the man-made crisis. The government has earmarked ¥25 trillion for reconstruction through March 2016, but about 50,000 people from Fukushima Prefecture are still unable to return home due to radiation concerns.

Despite the triple meltdowns at Fukushima No. 1, which experts say are far more challenging to deal with than the partial meltdown of one reactor at Pennsylvania's Three Mile Island plant, Abe is eager to sell the nation's nuclear technologies and equipment overseas. He boasts that Japan can offer the world's highest safety standards that reflect lessons learned from Fukushima.

More than 400 nuclear reactors are already in operation in more than 30 countries across the globe, with dozens more under construction. More are expected, including hundreds in China alone by 2050.

Tokyo Electric Power Co., which runs Fukushima No. 1, is setting up a separate corporation in April to take apart the devastated plant. Tentatively called the "Decommissioning Company," it will be overseen by the Ministry of Economy, Trade and Industry and could evolve into a decommissioning organization for other plants both at home and abroad.

Academics, construction giants, electronics makers and risk management firms are rushing to get a piece of the action.
The government-funded International Research Institute for Nuclear Decommissioning also was set up last year. It brings together atomic power plant operators, construction companies and organizations of nuclear experts to promote research and development on nuclear decommissioning technologies, as well as cooperation between international and domestic entities.

The institute has received 780 funding proposals from around the world for ideas and technologies on treating and managing contaminated water, and another 220 on retrieving the three melted cores at Fukushima No. 1.

Domestic companies including Toshiba Corp., Mitsubishi Heavy Industries Ltd. and Hitachi Ltd. have been developing robots that can monitor radiation, decontaminate, remove tainted debris or conduct repairs, and some of them have been mobilized at the plant.

Standard decommissioning has been largely carried out by human workers so far. The institute's chief, Kazuhiro Suzuki, says the robotics technologies being developed to probe and remove melted fuel at Fukushima No. 1 could benefit these projects and need not be limited to severely damaged reactors.

"Decommissioning of aging reactors is an imminent task that all nuclear plant operators face," Suzuki said.

While robotics and other advanced technologies can reduce worker radiation exposure, they can also make cleanup faster and cheaper, according to Barrett, the Three Mile Island expert who now advises Tepco and the institute.
Experts in Japan are studying the British model, the National Decommissioning Authority, founded in 2005 to head the dismantling and cleanup of nuclear plants and manage their waste.

The decommissioning of the four reactors will take around 40 years, while the total cost could be as high as 10 times the standard process, which costs about ¥70 billion per reactor, Suzuki said.

After decommissioning 10 regular reactors and leading the cleanup at Three Mile Island, the U.S. government and nuclear industry see profits ahead, too. In February, representatives of 26 U.S. firms came to Tokyo for business talks with 50 domestic companies at a decommissioning forum co-sponsored by Japan and the U.S.

"We can work together and do so much more," said CB&I executive Austin Auger.

March 10, 2014

Too big for TEPCO to handle it alone

Editorial: Gov't must stand at helm in decommissioning of Fukushima reactors

http://mainichi.jp/english/english/perspectives/news/20140310p2a00m0na001000c.html

Three years after the Great East Japan Earthquake and tsunami, the spacious grounds of the Fukushima No. 1 Nuclear Power Plant host over 1,000 blue and gray water storage tanks. But unless a new tank is built every two days, then there will soon be no place to store the radioactively tainted water that continues to accumulate at the nuclear facility.

Just last month, an accident caused highly contaminated water to overflow from a tank at the plant. Continued mismanagement has greatly shaken the public's trust in the safety practices of the plant's operator, Tokyo Electric Power Co. (TEPCO).

It is expected to take three to four decades to decommission the plant's nuclear reactors. The decommissioning work is a tough task, unprecedented on a global scale, and in protecting the safety of Japanese residents, mistakes are forbidden. Clearly, it is a job too big for TEPCO alone to handle. The government must come forward, as Prime Minister Shinzo Abe has promised, and share in its responsibility to pave the way toward decommissioning of the reactors.

Every day, more than 4,000 workers hired by TEPCO, affiliated companies and subcontracting firms are working at the crippled plant to decommission the reactors. The upper level of the building housing the No. 3 reactor, whose roof was blown away in a hydrogen explosion that left its steel frame

exposed, has been cleared. And workers are continuing to remove spent nuclear fuel from a pool in the building housing the No. 4 reactor -- a task that began last autumn. These are small steps in the decommissioning process.

Yet the problem of contaminated water could hinder this work. In last month's accident, it emerged that roughly 100 tons of water contaminated with some 8 million times' the level of radioactive materials that could be released into the sea had spilled from a water storage tank. The contaminated water overflowed when workers tried to pump water into a tank that was already nearly full. It turned out that they should have been pumping the water into a different tank. It seems like a simple mistake, but it created a grave situation.

The valve of the tank into which the contaminated water should have been pumped was closed, while the valve on the one that was already nearly full was open. TEPCO needs to carefully investigate the matter to determine whether it was a mistake or intentional. The fact that workers ignored an alarm indicating that the water level of the tank was too high, thinking it was a false alarm, highlights the sloppy risk-management practices at the nuclear complex.

TEPCO was responsible for the leak of 300 tons of contaminated water last summer, too. After this, the utility installed water-level gauges to sound warnings in a bid to prevent further leaks. Workers also boosted their surveillance work. But if such measures to prevent a recurrence do not come together to serve a purpose, then it can't be helped when the public starts doubting the company's safety management system.

Some 430,000 tons of contaminated water has already accumulated at the plant, and the environmental risks are only increasing. TEPCO plans to treat water with its advanced liquid processing system (ALPS), which it says can remove radioactive materials other than tritium, and the company hopes to pump groundwater into the sea before it reaches the reactor buildings. But the ALPS system has been plagued with trouble and there is no telling when its operations will be in full swing. Furthermore, TEPCO's negotiations with local fishermen remain at a standstill. Obviously the company can't be left to its own devices.

In his policy speech in January this year, Abe touched on the handling of contaminated water, saying, "The government will stand at the fore, and will move ahead with preventive and multilayered countermeasures." Surely "standing at the fore" means moving forward with the necessary support, guidance and oversight, and taking responsibility should anything happen. The government should show this kind of resolve.

The decommissioning process is also a battle against radiation. The radiation dosages of workers on-site are increasing day by day. The upper exposure limit is 50 millisieverts over the course of one year and 100 millisieverts over the course of five years. After this, workers are not permitted to take on jobs that expose them to radiation for five years.

As work to decommission the reactors progresses, more work inside the reactor buildings, where radiation levels are high will be undertaken. As a result, more workers are likely to hit their radiation exposure limit. An important task for the future will be finding more workers.

"People on-site are aging. I wonder if there will be sufficient workers in 10 years' time," asked the president of one subcontracting firm. The firm had 20 workers before the March 2011 earthquake and tsunami that triggered the disaster at the plant, but they were scattered during evacuations, and fearing exposure to radiation, none of them has come back, the company president says.

To secure workers, it is necessary to first secure their safety. In this respect, management of radiation exposure is important. TEPCO should not merely cover its own workers, but make sure that radiation exposure management extends to all workers on-site.

Workers also need to receive a fair wage. Due to multilayered subcontracting, it is feared that the daily wages TEPCO is forking out are shrinking before workers receive the money. To give workers a better deal, TEPCO in December last year raised the daily wage it provides to prime contractors by 10,000 yen. It needs to contact cooperating firms and boost its cooperation with them to make sure that all workers receive the extra money.

In April, a decommissioning company handling the decommissioning of nuclear reactors will be formed as an offshoot of TEPCO. It is reportedly considering amending the on-site reporting line and putting the services of workers from outside the company to use.

However, the barriers that TEPCO has to surmount are extremely high. Under a government proposal, work to remove fuel from the No. 1 and 2 rectors at the disaster-hit Fukushima plant is slated to commence in fiscal 2020. The following year, officials plan to remove fuel from the No. 3 reactor. But it is still unclear where the melted fuel is and in what state it is in. And a major issue that remains is what to do with it once it has been removed.

It is necessary to collate research results from Japan and overseas, and develop pertinent technology. The government will reorganize the Nuclear Damage Liability Facilitation Fund and create a new organization supporting the decommissioning of reactors. We hope it will also cooperate with the International Research Institute for Nuclear Decommissioning, which is represented by power companies and companies involved in nuclear power, and set up an effective system.

To make the long process of decommissioning nuclear reactors successful, it is vital that the government stands at the helm, bringing together the power of the public and private sectors

Decommissioning Technology

Decommissioning Technology

http://www3.nhk.or.jp/nhkworld/newsline/201403102314.html

February 28, 2014

Dismantling Fukushima

Dismantling Fukushima: The World's Toughest Demolition Project - Taking apart the shattered power station and its three melted nuclear cores will require advanced robotics

By Eliza Strickland

A radiation-proof superhero could make sense of Japan's Fukushima Daiichi nuclear power plant in an afternoon. Our champion would pick through the rubble to reactor 1, slosh through the pooled water inside the building, lift the massive steel dome of the protective containment vessel, and peek into the pressure vessel that holds the nuclear fuel. A dive to the bottom would reveal the debris of the meltdown: a hardened blob of metals with fat strands of radioactive goop dripping through holes in the pressure vessel to the floor of the containment vessel below. Then, with a clear understanding of the situation, the superhero could figure out how to clean up this mess.

Unfortunately, mere mortals can't get anywhere near that pressure vessel, and Japan's top nuclear experts thus have only the vaguest idea of where the melted fuel ended up in reactor 1. The operation floor at the top level of the building is too radioactive for human occupancy: The dose rate is 54 millisieverts per hour in some areas, a year's allowable dose for a cleanup worker. Yet, somehow, workers must take apart not just the radioactive wreck of reactor 1 but also the five other reactors at the ruined plant.

This decommissioning project is one of the biggest engineering challenges of our time: It will likely take 40 years to complete and cost US $15 billion. The operation will involve squadrons of advanced robots, the likes of which we have never seen.

Nothing has been the same in Japan since 11 March 2011, when one of history's worst tsunamis flooded Fukushima Daiichi, crippled its emergency power systems, and triggered a series of explosions and meltdowns that damaged four reactors. A plume of radioactive material drifted over northeast Japan and settled on towns, forests, and fields, while plant workers scrambled to pour water over the nuclear cores to prevent further radioactive releases. Nine months later, the Tokyo Electric Power Co. (TEPCO), the utility company that operates the plant, declared the situation stable.

Stability is a relative concept: Although conditions at Fukushima Daiichi aren't getting worse, the plant is an ongoing disaster scene. The damaged reactor cores continue to glow with infernal heat, so plant employees must keep spraying them with water to cool them and prevent another meltdown. But the pressure vessels and containment vessels are riddled with holes, and those leaks allow radioactive water to stream into basements. TEPCO is struggling to capture that water and to contain it by erecting endless storage tanks. The reactors are kept in check only by ceaseless vigilance.

TEPCO's job isn't just to deal with the immediate threat. To placate the furious Japanese public, the company must clean up the site and try to remove every trace of the facility from the landscape. The ruin is a constant reminder of technological and managerial failure on the grand scale, and it requires a proportionally grand gesture of repentance. TEPCO officials have admitted frankly that they don't yet know how to accomplish the tasks on their 40-year road map, a detailed plan for decommissioning the plant's six reactors. But they know one thing: Much of the work will be done by an army of advanced robots, which Japan's biggest technology companies are now rushing to invent and build.

Here's some more bad news: Chernobyl and Three Mile Island, the only other commercial-scale nuclear accidents, can't teach Japan much about how to clean up Fukushima Daiichi. The Chernobyl reactor wasn't dismantled; it was entombed in concrete. The Three Mile Island reactor was defueled, but Lake Barrett, who served as site director during that decommissioning process, says the magnitude of the challenge was different. At Three Mile Island the buildings were intact, and the one melted nuclear core remained inside its pressure vessel. "At Fukushima you have wrecked infrastructure, three melted cores, and you have some core on the floor, ex-vessel," Barrett says. Nothing like Fukushima, he declares, has ever happened before.

Barrett, who is now a consultant for the Fukushima cleanup, says TEPCO is taking the only approach that makes sense: "You work from the outside in," he says, dealing with all the peripheral problems in the buildings before tackling the heart of the matter, the melted nuclear cores. During the first three years of the cleanup, TEPCO has been surveying the site to create maps of radiation levels. The next step is removing radioactive debris and scrubbing radioactive materials off walls and floors. Spent fuel must be removed from the pools in the reactor buildings; leaks must be plugged. Only then will workers be able to flood the containment structures so that the melted globs of nuclear fuel can safely be broken up, transferred to casks, and carted away.

Many of the technologies necessary for the decommissioning already exist in some form, but they must be adapted to fit the unique circumstances of Fukushima Daiichi. "It's like in the 1960s, when we

wanted to put a man on the moon," says Barrett. "We had rocketry, we had physics, but we had never put all the technologies together." Just as with the moon shot, there is no guarantee that this epic project can be accomplished. But faced with the wrath of the Japanese people, TEPCO has no choice but to try.

Graphic: How To Take Apart A Melted-Down Reactor

To begin the first step—inspection—TEPCO sent in robots to map the invisible hot spots throughout the smashed reactor buildings. The first to arrive were the U.S.-made PackBot and Warrior, hastily shipped over from iRobot Corp. of Bedford, Mass. But Japan is justly proud of its own robotics industry, so the question arose, Why didn't TEPCO have robots ready to respond in a nuclear emergency? Yoshihiko Nakamura, a University of Tokyo robotics professor, has the dispiriting answer. The government did fund a program on robotics for nuclear facilities in 2000, following a deadly accident at a uranium reprocessing facility. But that project was shut down after a year. "[The government] said this technology is immature, and it is not applicable for the nuclear systems, and the nuclear systems are already 100 percent safe," Nakamura explains. "They didn't want to admit that the technology should be prepared in case of accident."

Still, some roboticists in Japan carried on their own research despite the government's indifference. In the lab of Tomoaki Yoshida, a roboticist at the Chiba Institute of Technology, near Tokyo, robots have learned to crawl over rubble and to climb up and down steps. These small tanks roll on a flexible series of treads, which can be lifted or lowered individually to allow the bot to manage stairs.

After the Fukushima accident, Yoshida's academic research became very relevant. With seed money from the government, he constructed two narrow metal staircases proportioned like the 5-floor staircases inside the Fukushima Daiichi reactor buildings. This allowed Yoshida to determine whether his bots could navigate those cramped stairs and tight turns. His acrobatic Quince robots proved themselves able, and after hundreds of tests they received TEPCO's clearance for field operations. In the summer of 2011, the Quince bots became the first Japanese robots to survey the reactor buildings.

The Quinces were equipped with cameras and dosimeters to identify radioactive hot spots. But the robots struggled with a communication issue: The nuclear plant's massive steel and concrete structures interfere with wireless communication, so the Quinces had to unspool cables behind them to receive commands and transmit data to their operators. The drawback of that approach soon became apparent. One Quince's cable got tangled and damaged on the third floor of reactor 2, and the lonely bot is still sitting there to this day, waiting for commands that can't reach it.

Slideshow: Meet the Robots of Fukushima Daiichi

Back at Yoshida's lab, where modest bunk beds bespeak the dedication of his students, the team is currently working on a new and improved survey bot named Sakura. To guard against future tangles, Sakura not only unspools cable behind, it also automatically takes up the slack when it changes direction. It's waterproof enough to roll through puddles, and it can carry a heavy camera capable of detecting gamma radiation. The bot can tolerate that radiation: Yoshida's team tested its electronics (the CPU, microcontrollers, and sensors) and found that they're radiation-tolerant enough to perform about 100 missions before any component is likely to fail. However, the robot itself becomes too

radioactive for workers to handle. Sakura must therefore take care of itself: It recharges its batteries by rolling up to a socket and plugging itself in.

The second step in the Fukushima decommissioning is decontamination, because only when that is complete will workers be able to get inside to tackle more complex tasks. The explosions that shattered several of the reactor structures sprayed radioactive materials throughout the buildings, and the best protective suits for workers in hot zones are of little use against the resulting gamma radiation—a worker would have to be covered from head to toe in lead as thick as the width of a hand. After the accident, the Japanese government called for robots that could work on decontamination, and several of Japan's leading companies rose to the challenge. Toshiba and Hitachi have designed robots that use jets of high-pressure water and dry ice to abrade the surfaces of walls and floors; the robots will scour away radioactive materials along with top layers of paint or concrete and vacuum up the resulting sludge. But the robots' range is defined by their own communication cables, and they can carry only limited amounts of their cleaning agents. Another bot, the Raccoon, has already begun nosing across the floor in reactor building 2, trailing long hoses behind it to supply water and suction.

To clear a path for the robotic janitors, another class of robots has been invented to pick up debris and cut through obstacles. The ASTACO-SoRa, from Hitachi, has two arms that can reach 2.5 meters and lift 150 kilograms each. The tools on the ends of the arms—grippers, cutting blades, and a drill—can be exchanged to suit the task. However, Hitachi's versatile bot is limited to work on the first floor, as it can't climb stairs.

Photos:
TEPCO **Out Of The Pool:** Spent fuel pools inside the damaged reactor buildings contain hundreds of nuclear fuel assemblies. TEPCO is emptying reactor 4's pool [top] first. In the extraction process, a cask is lowered into the pool and filled with radioactive fuel assemblies. Then the cask is transported to a safer location, lowered into another pool [middle], and unloaded. The job is made more complicated because some of the assemblies are covered with debris [bottom] from the accident's explosions.

Removing spent fuel rods is the third step. Each reactor building holds hundreds of spent fuel assemblies in a pool on its top floor. These unshielded pools, perfectly safe when filled with water, became a focus of public fear during the Fukushima Daiichi accident. After reactor building 4 exploded on 15 March, many experts worried that the blast had damaged the structural integrity of that building's pool and allowed the water to drain out. The pool was soon determined to be full of water, but not before the chairman of the U.S. Nuclear Regulatory Commission had caused an international panic by declaring it dry and dangerous. The reactor 4 pool became one of TEPCO's urgent decommissioning priorities, not only because it's a real vulnerability but also because it's a potent reminder of the accident's terrifying first days.

The process of emptying that pool began in November 2013. TEPCO workers use a newly installed cranelike machine to lower a cask into the pool, then long mechanical arms pack the submerged container with fuel assemblies. The transport cask, fortified with shielding to block the nuclear fuel's radiation, is lowered to a truck and brought to a common pool in a more intact building. The building 4 pool contains 1533 fuel assemblies, and moving them all to safety is expected to take a year. The same

procedure must be performed at the highly radioactive reactors 1, 2, and 3 and the undamaged (and less challenging) reactors 5 and 6.

Slideshow: Living with Fear in Fukushima

Containing the radioactive water that flows freely through the site is the fourth step. Every day, about 400 metric tons of groundwater streams into the basements of Fukushima Daiichi's broken buildings, where it mixes with radioactive cooling water from the leaky reactor vessels. TEPCO treats that water to remove most of its radioactive elements, but it can't be rendered entirely pure—and as a result local fishermen have protested plans to release it into the sea. To store the accumulating water, TEPCO has installed more than 1000 massive tanks, which themselves must be monitored vigilantly for leaks.

TEPCO hopes to stop the flow of groundwater with a series of pumps and underground walls, including an "ice wall" made of frozen soil. Still, at some point the Japanese public must grapple with a difficult question: Can the stored water ever be released into the sea? Barrett, the former site director of Three Mile Island, has argued publicly that the processed water is safe, as contamination is limited to trace amounts of tritium, a radioactive isotope of hydrogen.

Tritium is less dangerous than other radioactive materials because it passes quickly through the body; after it's diluted in the Pacific, Barrett says, it would pose a negligible threat. "But releasing that water is an emotional issue, and it would be a public relations disaster," he says. The alternative is to follow the Three Mile Island example and gradually dispose of the water through evaporation, a process that would take many years.

TEPCO must also plug the holes in the reactor vessels that allow radioactive cooling water to flow out. Many of the leaks are thought to be in the suppression chambers, doughnut-shaped structures that ring the containment vessel and typically hold water, which is used to regulate temperature and pressure inside the pressure vessel during normal operations. Shunichi Suzuki, TEPCO's general manager of R&D for the Fukushima Daiichi decommissioning, explains that one of his priorities is developing technologies to find the leak points in the suppression chambers.

Sidebar: Selling Nuclear Safety to the Public

"There are some ideas for a submersible robot," Suzuki says, "but it will be very difficult for them to find the location of the leaks." He notes that both the suppression chambers and the rooms that surround them are now filled with water, so there's no easy way to spot the ruptures; it's not like finding the hole in a leaky pipe that's spraying water into the air. Among the robot designs submitted by Hitachi, Mitsubishi, and Toshiba is one bot that would crawl through the turbid water and use an ultrasonic sensor to find the breaches in the suppression chambers' walls.

If robots prove impractical, TEPCO may take a more heavy-handed approach and start pouring concrete into the suppression chamber or the pipes that lead to it. "If it's possible to make a seal between the containment vessel and the suppression chamber, then the leaks don't matter," Suzuki says. One way or another, TEPCO hopes to have all the leaks stopped up within three years. Sealing the leaks is a necessary precondition for the final and most daunting task.

Photos, top: TEPCO; bottom: The Yomiuri Shimbun/AP Photo **Water, Water Everywhere:** Groundwater flowing through the site mixes with radioactive cooling water leaking from reactor buildings and must therefore be stored and treated. To contain the accumulating water, TEPCO is filling fields with storage tanks [bottom]. These tanks must be monitored for leaks [top]. In August 2013, TEPCO admitted that 300 metric tons of contaminated water had leaked from one tank.
Removing the three damagednuclear cores is the last big step in the decommissioning. As long as that melted fuel glows inside reactors 1, 2, and 3, Fukushima Daiichi will remain Japan's ongoing nightmare. Only once the fuel is safely packed up and carted away can the memory begin to fade. But it will be no easy task: TEPCO estimates that removing the three melted cores will take 20 years or more.

First, workers will flood the containment vessels to the top so that the water will shield the radioactive fuel. Then submersible robots will map the slumped fuel assemblies within the pressure vessels; these bots may be created by adapting those used by the petroleum industry to inspect deep-sea oil wells. Next, enormously long drills will go into action. They must be capable of reaching 25 meters down to the bottoms of the pressure vessels and breaking up the metal pooled there. Other machines will lift the debris into radiation-shielded transport casks to be taken away.

Making the task more complicated is the design of the reactors. They have control rods that project through the bottom of the pressure vessels, and the entry point for each of those control rods is a weak spot. Experts believe that most of the fuel in reactor 1, and some in reactors 2 and 3, leaked down through those shafts to pool on the floor of the containment vessel below. To reach that fuel, some 35 meters down, TEPCO workers will have to drill through the steel of the pressure vessel and work around a forest of wires and pipes.

Before TEPCO can even develop the proper fuel-handling tools, Suzuki says, the company must get a better understanding of the properties of the corium—the technical term for the mess of metals left behind after a meltdown. The company can't just copy the drills that broke up the melted core of the Three Mile Island reactor, says Suzuki. "At Three Mile Island, [the core] remained in the pressure vessel," he says. "In our case, it goes through the pressure vessel, so it melted stainless steel. So our fuel debris must be harder." The melted fuel may also have a lavalike consistency, with a hard crust on top but softer materials inside. TEPCO is now working with computer models and is planning to make an actual batch of corium in a laboratory to study its properties.

When the core material is broken up and contained, it will be whisked away to some to-be-determined storage facility. Over the decades its radioactivity will gradually fade, along with the Japanese public's memory of the accident. It's a shame that those twisted blobs of corium are too dangerous to be displayed in a museum, where a placard could explain that we human beings are so clever, we're capable of building machines we can't control.
Depending on whom you ask, nuclear power stations like Fukushima Daiichi are exemplars of either humanity's ingenuity or hubris. But, the museum placard might add, these metallic blobs, plucked from the heart of an industrial horror, prove something else—that we humans also have the grit and perseverance to clean up our mistakes.

This article originally appeared in print as "Fukushima's Next 40 Years."

March 20, 2014

NRA: Concentrate on Fukushima

NRA urges TEPCO to focus on Fukushima Daiichi

http://www3.nhk.or.jp/nhkworld/english/news/20140321_01.html

Japan's nuclear regulator has urged the operator of the crippled Fukushima Daiichi nuclear plant to focus on decommissioning work. This follows a series of problems in handling contaminated water at the facility.

Tokyo Electric Power Company executives on Tuesday briefed Nuclear Regulation Authority commissioners on work at the plant.

More than 100 tons of contaminated water leaked from one of the storage tanks. A malfunction in a water filtering system caused highly radioactive water to flow into treated water tanks.

NRA Commissioner Toyoshi Fuketa said the troubles could have been prevented.

He called on TEPCO to place top priority on decommissioning reactors and dealing with radioactive water. He urged the company not to try and save money when dealing with safety measures at the plant.

NRA Chairman Shunichi Tanaka said TEPCO should improve working conditions to ensure the safety of, and maintain morale among, more than 4,000 workers at the plant.

TEPCO President Naomi Hirose said he will work hard as a top executive to restart the water treatment system and reduce tainted water.

April 8, 2014

What do you do with 560,000 cubic meters of rubble?

Fukushima plant to create 560,000 cubic meters of rubble by mid-2020s

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201404080066

By SHUNSUKE KIMURA/ Staff Writer

IWAKI, Fukushima Prefecture--Tokyo Electric Power Co., the operator of the Fukushima No. 1 nuclear power plant, announced April 7 that the crippled plant will likely generate a massive 560,000 cubic meters of radiation-contaminated debris by fiscal 2027.

The daunting size of the rubble amounts to half the volume of Tokyo Dome, an iconic indoor stadium in central Tokyo, the utility reported during a meeting with the central government to discuss the plant's decommissioning and contaminated water problem, held in Iwaki.

The amount will be more than double the 250,000 cubic meters of solid waste materials that the utility has accumulated at the plant since the accident triggered by the March 2011 Great East Japan Earthquake and tsunami, through fiscal 2013, according to the government and TEPCO.

TEPCO plans to reuse or recycle materials of low contamination levels, but it will still require a storage facility to accommodate debris of 160,000 cubic meters, company officials said. The amount is more than 200 times the volume that a 25-meter swimming pool can hold.

The total amount of contaminated rubble and debris will more than double by fiscal 2027 because there is a large portion of concrete rubble that was generated from explosions of reactor buildings and remains untouched.

Trees in the plant compound that were cleared to make space for storage tanks for the ever-increasing volume of contaminated water will be also accounted for as contaminated waste materials, TEPCO officials said.

TEPCO plans to scrap water storage tanks that are no longer in use, metals with low contamination levels and concrete rubble and use them, for example, as materials for roadbeds in the plant compound.

Removing the melted nuclear fuel from inside the reactors, one of the most critical tasks in the decommissioning process, will have started by fiscal 2027.

More storage space needed for Daiichi debris

http://www3.nhk.or.jp/nhkworld/english/news/20140408_05.html

The people in charge of decommissioning the crippled Fukushima Daiichi nuclear plant say they don't have enough storage space for all the debris.

Engineers at the Tokyo Electric Power Company discussed the problem with government officials on Monday.

They estimate that the decommissioning work will produce 560,000 cubic meters of debris over the next 13 years.

They plan to burn wood and other combustibles. They will crush low radiation rubble and use it to pave roads in the plant's compound. They estimate this will reduce the volume of debris to 220,000

cubic meters.

Workers are building storage facilities at the plant. But the engineers say they'll need 160,000 cubic meters more storage space. That's enough to fill more than 200 swimming pools.

April 25, 2014

Do it without water!

Institute seeks nuclear fuel debris removal ideas

http://www3.nhk.or.jp/nhkworld/english/news/20140425_38.html

A Japanese government institute is asking engineers from Japan and abroad for their input on removing melted fuel from the Fukushima Daiichi nuclear plant.

The current plan is to fill the reactor containment vessels with water to shield workers from high levels of radiation as they retrieve the fuel.

During a seminar in Tokyo on Friday, officials from the International Research Institute for Nuclear Decommissioning, or IRID, told engineers that this method may not be feasible.

They said surveys of the containment vessels found that it may be difficult to locate and plug leaks.

The officials are urging the engineers to **study new technology that can monitor fuel debris in a highly radioactive atmosphere, and can protect workers from radiation without the use of water.** The government will begin accepting proposals in June.

IRID Executive Director Kazuhiro Suzuki says he hopes nuclear plant engineers will come up with innovative solutions to the problem.

A roadmap for decommissioning the plant projects that fuel removal will start in 2020, or later, at 3 reactors that suffered meltdowns in the 2011 disaster.

April 26, 2014

Probing containment vessel soon

Detailed containment vessel probe to begin soon

http://www3.nhk.or.jp/nhkworld/english/news/20140427_06.html

The operator of the crippled Fukushima Daiichi nuclear power plant is planning a more detailed probe into the containment vessels of the 3 damaged reactors.

Tokyo Electric Power Company hopes to learn more details to assist with the retrieval of melted fuel.

The operator plans to fill the containment vessels of reactors 1, 2 and 3 with water. This will help to shield workers from radiation as they attempt to retrieve the fuel. The utility is now checking the vessels for necessary repair work to prevent water leakage.

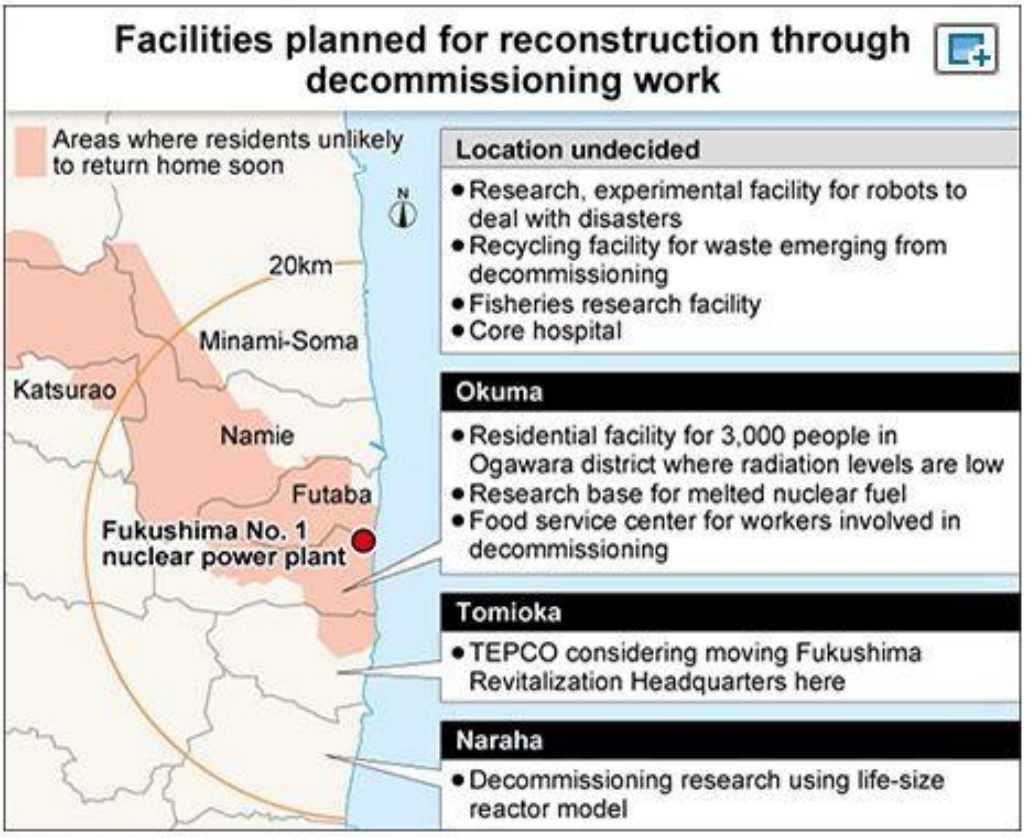
Earlier in April at the No. 3 reactor, remote-controlled cameras detected water pooled below a metal scaffold inside an adjoining room. Officials have also confirmed the sound of water flowing in the room. But the exact source is still not clear.

As early as May, TEPCO will begin using a special endoscopic camera to inspect areas below the scaffold. One area of interest is the section that connects the adjoining room with the containment vessel. The operator believes contaminated water came into the room through this connection.

Robots will be used to pinpoint breaches in the No.1 and 2 reactors where contaminated water has been pouring in. The probe into reactor 1 will focus on checking the bottom of the containment vessel. The reactor 2 probe will center on the donut-shaped suppression chamber at the bottom of the containment vessel.

June 9, 2014

New "decommissioning town" an incentive for evacuees to return?



The Asahi Shimbun

Reactor 'decommissioning town' planned to rebuild Fukushima

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201406090045

By NORIYOSHI OHTSUKI/ Senior Staff Writer

The government's reconstruction plans for Fukushima Prefecture include creating a town for 5,000 people tasked with decommissioning the crippled nuclear plant, but some local leaders doubt anyone else will want to live there.

According to the proposal of the Cabinet Office and the Ministry of Economy, Trade and Industry, the new town will help to create jobs and prompt evacuees to return to their homes near the Fukushima No. 1 nuclear power plant.

The decommissioning process for the four reactors at the plant is expected to take between 30 and 40 years to complete

.

However, some local officials said that emphasizing the decommissioning work could underline the severity of the nuclear accident and further delay the return of residents who fled their homes after the 2011 nuclear accident started.

"While the plan sounds like something like a dream, will evacuees want to return to a community where only workers (involved in decommissioning) are living?" a local government leader asked.
"There is the possibility that the return of residents will only be pushed further into the future."

Kazuyoshi Akaba, a senior vice industry minister who is also chief of the government's task force handling the Fukushima nuclear disaster, presented the outline of a plan for developing an international research and industrial city in Fukushima to local government leaders on June 9.

One proposal in the plan is to rebuild the coastal area of Fukushima by focusing on decommissioning work.
According to the plan, an estimated 4,000 to 5,000 engineers and workers will be needed to handle technological development and actual decommissioning work. Several hundred researchers would also be required for the task.

Currently, most workers at the Fukushima No. 1 plant commute to the site from outside a 20-kilometer radius.

The plan would concentrate decontamination efforts, first in Okuma town's Ogawara district, about 10 km from the nuclear plant.

A residential district would then be constructed for about 3,000 workers and researchers by 2018. The project would include a hospital and restaurants to make the district a core part of the overall reconstruction effort.

"We can create a unique base that would attract global attention by taking advantage of technological developments for decommissioning purposes," Akaba said.

Under the plan, a life-size model of a reactor at the Fukushima No. 1 plant will be built in the town of Naraha and made available to universities and companies involved in decommissioning research.

The government plans to lift the evacuation order for Naraha as early as spring 2015.

The Fukushima Revitalization Headquarters of Tokyo Electric Power Co., operator of the stricken plant, would be moved from Naraha to Tomioka, closer to the plant, in fiscal 2015.

Under the decommissioning-reconstruction plan, other facilities would be built in the coastal area of Fukushima Prefecture, including an advanced thermal power plant and a base for the development of new energy sources. Such measures will lead to an estimated 15,000 new jobs.

"It will be possible to create a coastal-area community of about 5,000 people needed for the decommissioning work," a senior industry ministry official said. "That community would be used as an incentive to have those who evacuated return to the area."

Okuma Mayor Toshitsuna Watanabe expressed hope for the plan since there are currently no prospects for evacuees returning to the town.

"There will be a need to rebuild communities from scratch," Watanabe said.

The central government's evacuation order currently covers 10 municipalities with a total population of about 81,000. According to a government survey, about 40 percent of evacuees said they had no intention of returning to their homes in Fukushima Prefecture.

June 11, 2014

"The order of magnitude is worse"

Nuclear Watch: Learning from Three Mile Island

http://www3.nhk.or.jp/nhkworld/newsline/201406111317.html

How to remove fuel debris from the damaged reactors ?

The only people which have done this kind of work are the Americans after the Three Mile Island accident when one of the two reactors at the power plant melted down (35 years ago)

NHK obtained special authorization to access 1,000 videotapes made by the US engineers while removing fuel debris.

The first camera was inserted in the reactor after 3 years [...] " a lot of debris… something that looked like rock…" (more than 100 tons of debris were found)

6 years after the accident, engineers started to remove debris. (with a robot arm). The reactor had to be filled with water. Many challenges had to be faced (eg. microorganism growth from the heat reduced visibility and slowed down the work, debris extremely hard).

William Austin who was responsible for the work at TMI thinks what is waiting at Fukushima will be much more difficult (the fuel has melted through the reactor core, we are talking of three reactors to dismantle not just one) "The order of magnitude is worse. I can't conceive of how much difficulty you've got," he said.

June 19, 2014

International research center to help with decommissioning

Research center planned for Fukushima decommission

http://www3.nhk.or.jp/nhkworld/english/news/20140619_36.html

Prime Minister Shinzo Abe and the science and technology minister have agreed to set up an integrated research center for more rapid decommissioning of the crippled Fukushima Daiichi nuclear plant.

Abe and science and technology minister Hakubun Shimomura on Thursday agreed to establish the international joint research center in April of next year. They agreed that the government needs to take the lead in the project.

The Japan Atomic Energy Agency is developing remote control technology for the decommissioning.

But analysts point out the lack of an integrated research center.

The new center will invite leading researchers and engineers from universities and research institutes in Japan and foreign countries.
At the center, experts who have handled nuclear accidents overseas will give classes on what they learned.

July 9, 2014

More stringent safety measures for Fukushima Daiichi?

New safety rules may be applied to Fukushima plant

http://www3.nhk.or.jp/nhkworld/english/news/20140709_28.html

Japan's nuclear regulator is considering stricter safety measures for the crippled Fukushima Daiichi plant, which is being decommissioned.

Serious damage to the plant's reactor buildings and highly radioactive wastewater in their basements and elsewhere have been hampering decommissioning work.

At issue are measures to prepare for another strong earthquake and tsunami.

At Wednesday's meeting of the Nuclear Regulation Authority, commissioner Toyoshi Fuketa pointed out the need to consider improved safety measures.

Fuketa stressed the seriousness of the radioactive water problem in case of another disaster.

Chairman Shunichi Tanaka agreed, and the authority decided to urgently assess a range of problems.

They agreed to refer to new safety standards the regulator introduced for other nuclear plants in Japan.

The body also discussed a delay in work to freeze wastewater in underground utility tunnels at the plant to block further inflows of water and stop contaminated water from leaking out to sea.

Members urged that the effort be speeded up. Some expressed doubt as to whether the plant's operator has a sense of crisis.

September 5, 2014

Decommissioning old ones

Utilities consider decommissioning old reactors

http://www3.nhk.or.jp/nhkworld/english/news/20140905_45.html

The Japanese government will consider measures to ease the financial impact on utility companies when they decommission their old nuclear reactors.

The government wants to cut the country's dependence on nuclear power.

Last year, nuclear regulators introduced tougher safety guidelines for power plants. The regulators limited the lifespan of nuclear reactors to 40 years. They can grant extensions of up to 20 years under certain conditions.

Seven reactors at 5 power plants have reached, or will soon reach, the 40-year-mark.

The government has given the operators until next July to decide whether to apply for an extension or take the expensive step of scrapping them.
Industry ministry officials say they are considering ways to ease the financial impact and encourage the companies to decommission their old reactors.

Industry Minister, Yuko Obuchi said the government will help utilities to restart reactors that have been found to be safe. At the same time, she said, the government will help them decommission their reactors if they choose.

Japan's 48 commercial reactors are all offline. Nuclear regulators are studying safety measures at several plants to determine whether they can be restarted.

Kansai Electric mulling over decommissioning aging Mihama reactors

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201409050037

By KOJI NISHIMURA/ Staff Writer
OSAKA--Kansai Electric Power Co. is considering decommissioning two reactors at its Mihama nuclear power plant in Fukui Prefecture, but is intent on restarting two others at its Takahama plant in the same prefecture, sources said.
More than 40 years have passed since the No. 1 and 2 reactors at the facility in Mihama went into operation. Now, officials at the utility feel the high cost of maintaining the reactors to meet new government safety standards may be too prohibitive.
A final decision on decommissioning the two reactors will be made before the end of the year, whereby the utility will then meet with officials from Fukui Prefecture and the Mihama municipal government to discuss their plans.
Kansai Electric officials are also moving toward the resumption of operations at the relatively newer No. 3 and No. 4 reactors at the Takahama nuclear power plant, once those reactors are confirmed safe.
In its basic energy plan, the central government described nuclear energy as an "important base-load power source" and intends to maintain a certain number of plants. While the central government is considering decommissioning older nuclear facilities, it has not rejected resuming operations at other plants, nor the rebuilding and expanding of existing plants and constructing of new ones.
Kansai Electric’s plans are in keeping with that central government policy.
In 2010, Kansai Electric made the decision to operate the No. 1 Mihama reactor for a maximum of 50 years, for which it obtained consent from the local communities. That reactor first went online in 1970.
Preparations were also made to operate the No. 2 reactor, which began operations in 1972, beyond 40 years.
However, the revised law on regulating nuclear reactors that went into effect last year, in principle, set a period of 40 years for operating reactors. The power companies can seek a one-time exemption to extend operations for an additional 20 years.

Implementing that extension, though, requires a "special inspection" to determine the condition of vital equipment. Reactors must also pass a safety check by the Nuclear Regulation Authority using the newer, stricter standards.
In order to meet those new standards, the No. 1 and 2 reactors at Mihama will require huge investments of time and money to deal with various issues, including fire prevention. Moreover, the Mihama plant faces another problem, with a fault line running under the site.
The two reactors have a combined power generation capacity of 840 megawatts, which is smaller than the capacity of a single reactor constructed after the Mihama reactors went into operation.
Those factors will be considered, along with any impact on the company's management, in determining if the two reactors should be decommissioned.
Kansai Electric also faces a tight schedule if it wants to continue operating the Mihama reactors. It has to submit an application with the central government by July 2015 to do so, and the results of the special inspection must be included in that application.
The utility then must pass the NRA safety check by July 2016, which some company officials believe will make it harder to win approval to extend operations.
Meanwhile, Kansai Electric faces another problem because the price tag for decommissioning reactors is also prohibitive, with the average cost of permanently shuttering one running about 50 billion yen ($476 million).
That would have a negative effect on the value of Kansai Electric's nuclear-related assets and its financial situation.

September 6, 2014

High time to decommission

EDITORIAL: Speed up preparations to decommission nuclear reactors

http://ajw.asahi.com/article/views/editorial/AJ201409060027

In what should be described as an outrageously belated move, Kansai Electric Power Co. has begun considering decommissioning the No. 1 and No. 2 reactors at its Mihama nuclear power plant in Fukui Prefecture. Both are aged reactors that have been in service for more than 40 years. Moreover, a fault line runs underneath the site of the reactors.
Decommissioning the two reactors is the reasonable choice, and Kansai Electric should swiftly make the formal decision.
In response to the accident at Tokyo Electric Power Co.'s Fukushima No. 1 nuclear power plant, a revision has been made to the law regulating nuclear reactors to limit the life of nuclear reactors to 40 years in principle.
In addition, tighter nuclear safety standards have been introduced. These regulatory changes should serve as strong incentives for utilities to decommission aged reactors and those that demand huge investments to meet the new safety standards.
Even so, TEPCO's decision to decommission the No. 1 through No. 6 reactors of the Fukushima No. 1 plant has so far been the only move to scrap reactors.
Nuclear reactors cannot be made safe against accidents and terrorist attacks unless they are decommissioned and the nuclear fuel rods are removed for disposal.
Japan currently has 48 reactors, including the ones at the Mihama plant.
Many of them appear to have little chance of being restarted. Other electric utilities should take their cues from Kansai Electric's move concerning the reactors at the Mihama plant and start thinking seriously about decommissioning such reactors.

Deciding to remove these reactors from service, however, won't solve everything.
Decommissioning a reactor requires huge sums. Utilities have set aside part of the money they collect from customers for covering the related costs. But their reserves may not be sufficient in some cases.
The economy ministry has proposed a system to secure necessary funds by setting standard prices for electricity produced with nuclear power. But the envisioned system could end up serving as a plan to promote nuclear power generation by also financing the costs of building new nuclear power plants or expanding existing ones.
It is necessary to come up with a workable plan to secure funds to be used exclusively for decommissioning reactors.
A more serious problem is the tremendous amount of radioactive waste that would be produced in the decommissioning process.
Japan Atomic Power Co.'s Tokai nuclear power plant in Ibaraki Prefecture terminated its operation in 1998, and became the nation's first commercial nuclear power station to be decommissioned.
The start of work to dismantle the reactor at the plant was originally slated to begin in the current fiscal year. But last year, the company moved back the date for completing the decommissioning process by five years to fiscal 2025.
So-called low-level radioactive waste produced in the process, such as structural parts of the reactors, will be buried 50 to 100 meters underground, according to the company's plan. But the location of the disposal facility has yet to be determined.
Standards for securing safety at the disposal facility also have not been established.
This is not just a problem of the Tokai plant. In Japan, no decision has been made as to how and where to dispose of various categories of radioactive waste, from spent nuclear fuel to reactor parts.
The current situation could force utilities to keep such waste within the premises of existing nuclear plants.
The Abe administration has been focusing its nuclear power policy efforts on restarting offline reactors while doing little to make necessary preparations for decommissioning reactors.
It is urgently needed to tackle the raft of challenges related to reactor decommissioning, most **notably the problem of radioactive waste, irrespective of whether the government is seeking to promote or phase out nuclear power.**
The government should confront these challenges and make all-out efforts to solve them.

September 21, 2014

Mihama reactors "as a test case"

Mihama viewed as test case for Japan's aging nuclear reactors

http://www.japantimes.co.jp/news/2014/09/21/national/politics-diplomacy/mihama-viewed-as-test-case-for-japans-aging-nuclear-reactors/#.VCJo6BbivKc

In recognition of Japan's rapidly aging nuclear plants, Kansai Electric Power Co. has begun discussing the possibility of decommissioning the Mihama No. 1 and No. 2 reactors, now more than 40 years old, in Fukui Prefecture.
While Kepco officials insist no decision has been made, scrapping them instead of applying for a two-decade extension could set a precedent for other prefectures where older plants that went online in the 1970s and early 1980s, like the ill-fated Fukushima No. 1 plant, now face more stringent safety regulations, posing huge expenditures for any utility interested in keeping them.
The two Mihama reactors in question went into service in 1970 and 1972 and generate a combined 840,000 kw, a small amount compared with modern atomic units, which can generate over 1 million kw each.

Japan's maximum operating life span for a reactor stands at 40 years. After that, utilities can apply for a one-time, 20-year extension or commence a decommissioning process that can take up to three decades.
It's a tough choice, one that effects not only consumers, but also the municipalities hosting the plants and the utilities running them.
Keeping reactors online beyond 40 years is expected to become extremely expensive. In addition to the basic costs of meeting the new safety standards that took effect last year, the places hosting them are sure to place additional demands on utilities and the central government — demands that will require further funding and negotiations that will further delay reactivation.
In the case of the Mihama reactors, though, even if a 20-year extension were granted, it's unclear whether the cost of running them would be recouped by the time the reactors reach the age of 60.
If not, that means more red ink on Kepco's bottom line, and pressure on the government to pass off the losses to the end users in the Kansai region.
Time is running out to make a decision. Accordng to the government, any utilities wishing to continue running reactors past the 40-year threshold as of July 2016 will have to undergo an extra inspection, for which applications must be submitted by July 2015.
Utilities that apply will have to calculate the financial and political costs over the next two decades.
If they end up receiving state approval for an extension, they have to hope that the electricity from the reactors will generate enough revenue to cover all of the additional costs, both projected and unforeseen, without significantly denting their bottom line. Otherwise, they will have to start the dismantling process.
Yet decommissioning also involves big money. Utilities estimate that scrapping a single reactor will cost at least ¥50 billion, assuming that all goes as planned.
By 2016, all three of Kepco's Mihama reactors, as well as two of its four reactors at the Takahama plant, also in Fukui Prefecture, will be over 40 years old. This means Kepco must choose whether to dismantle or try to extend the lives of five of its 11 operating reactors.
On top of that, its No. 1 and No. 2 reactors at the Oi power station in Fukui will reach the 37-year mark in 2016, requiring another decision in the next couple of years.
For its part, the government has said it will provide some form of financial support to the utilities if reactors become subject to decommissioning or fail safety inspections and remain shut down.
"The utilities will decide whether to decommission individual reactors, but the government will support a smooth decommissioning process along with the restart of reactors whose safety has been guaranteed," new economy, trade and industry minister Yuko Obuchi said earlier this month.
Whatever decision Kepco arrives at, it will have a huge impact on Fukui Prefecture, where all 11 of the utility's reactors are situated. Since the mid-1970s, Fukui has received around ¥400 billion in nuclear power-related subsidies from the central government.
Of this, about ¥190 billion has gone directly to towns such as Mihama that rely on the money to build roads, bridges, dams and sewage systems as well as community centers and other social welfare facilities.
Officials visiting the host municipalities for regular inspections by the Nuclear Regulation Authority, the industry's new watchdog, as well as utility personnel, help fill local hotels, inns and restaurants, and support a variety of local service industries.
Concerned about what a future without nuclear subsidies might mean, Fukui Gov. Issei Nishikawa met with Obuchi on Sept. 9, just days after she was appointed industry minister, and asked her for additional funding for a variety of infrastructure projects, as well as a guarantee that atomic-related funding would ensure that reactors are completely decommissioned and removed.
"It's up to the central government to explain how it will take responsibility for securing a storage facility for the spent fuel from decommissioned reactors, for building a disposal facility for their radioactive waste, for ensuring the physical safety of the area hosting the reactor, and for dealing with the industrial and economic effects of decommissioning," Nishikawa said.
While Fukui is concerned, others in Kansai who have long worried about the reactors, especially their age, greeted the news of possible decommissioning with relief.

Aileen Mioko Smith of Kyoto-based Green Action, an anti-nuclear group, said tearing down the reactors would set a good precedent but added that **it is critical to include local participation in the process.**
"Local communities should be given the opportunity to enter the decommissioning business rather than again become subcontractors to huge conglomerates," she said, referring to the general contractors that built the plants.

September 29, 2014

Tokai reprocessing plant to be shut

Tokai reprocessing plant to be scrapped

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The Japan Atomic Energy Agency says it will scrap its Tokai nuclear fuel reprocessing plant north of Tokyo by April 2017 at earliest.

The decision to close the facility, announced on Monday, comes after stricter regulatory standards established following the 2011 Fukushima nuclear disaster.

The cost of revamping the Tokai plant to meet the new standards has been estimated at over 900 million dollars, masking it too expensive to maintain.

The plant extracts uranium and plutonium from spent nuclear fuel. It has processed about 1,140 tons of spent fuel since operations began in 1977.

Authorities say the transfer of the plant's functions to a reprocessing plant in Rokkasho Village, Aomori Prefecture, is almost complete.

The Tokai facility was expected to treat spent fuel from the Monju fast-breeder reactor in Fukui Prefecture, so its closure may negatively impact the government's policy to reuse spent nuclear fuel.
Source : World Nuclear News
http://www.world-nuclear-news.org/WR-Tokai-reprocessing-plant-to-shut-2909144.html

Tokai reprocessing plant to shut

https://www.world-nuclear-news.org/WR-Tokai-reprocessing-plant-to-shut-2909144.html

The Japan Atomic Energy Agency (JAEA) will shut its reprocessing plant in Tokai, reportedly due to the costs of modifications required under post-Fukushima safety regulations.

Following a meeting today of JAEA's reform commission, the agency announced that it will permanently shut down the Tokai facility in Ibaraki prefecture.
The Tokai plant is Japan's oldest reprocessing plant. Construction of the plant began in 1971, with trial operation starting in 1977. The plant entered full operation in 1981 but has stood idle since 2006 when a contract for reprocessing used fuel from commercial power reactors came to an end. The plant was mainly used for processing mixed-oxide (MOX) fuel from the Fugen experimental Advanced Thermal Reactor (ATR), which ceased operating in 2003.

The plant has reprocessed a total of some 1052 tonnes of used fuel comprising 88 tonnes of fuel from the Fugen ATR, 644 tonnes of boiling water reactor fuel, 376 tonnes of pressurized water reactor fuel and 9 tonnes of fuel from the Japan Power Demonstration Reactor (JPDR).
A JAEA spokesman told the Kyodo news agency that it had decided to shut the plant as it would cost too much to upgrade it to meet new safety rules. He said more than Y100 billion ($915 million) would be required to upgrade equipment and enhance safety for the Tokai plant to continue operating.
New safety rules for Japanese fuel cycle facilities came into force in late 2013. The requirements vary from facility to facility, but generally include reinforcement measures against natural threats such as earthquakes and tsunamis, and in some cases tornadoes, volcanoes and forest fires. At fuel fabrication plants, proper confinement of radioactive material is required, as are severe accident countermeasures for potential criticality accidents. Reprocessing plants need to demonstrate these as well as countermeasures specifically for terrorist attacks, hydrogen explosions, fires resulting from solvent leaks and vaporization of liquid waste.
JAEA said that the first part of the reprocessing process at Tokai, where used fuel is made into solution, will be shut soon. However, the second part, where these solutions are treated, will continue operating for about the next 20 years in order to treat used fuel solution currently stored at the facility.
Some 110 tonnes of unprocessed used fuel is also at the plant. The JAEA spokesman said that this fuel is likely to be sent overseas for reprocessing.
Researched and written
by World Nuclear News

September 30, 2014

TEPCO signs pact with Sellafield

Tepco, Sellafield to compare notes on decommissioning reactors

http://www.japantimes.co.jp/news/2014/09/30/national/tepco-sellafield-to-compare-notes-on-decommissioning-reactors/#.VCxXixanp1s

AFP-JIJI
Tokyo Electric Power Co. announced Tuesday it has agreed to share knowledge and experience on decommissioning damaged reactors with Britain's Sellafield.
Tepco has struggled with cleaning up the tsunami-battered Fukushima No. 1 plant, especially with safely storing radioactive water used to cool the reactors.
Sellafield, in England's far north, was the scene of a 1957 fire that resulted in a radioactive leak, and the company has since built up expertise in decommissioning nuclear reactors.
Both companies will benefit from the other's experience in cleaning up after a serious nuclear accident, according to a Tepco spokeswoman.
"This is the first such agreement between Tepco and a foreign firm that is also engaged in decommissioning nuclear reactors," she said. "Tepco hopes to learn as much as we can from the decades-long expertise of Sellafield."

TEPCO signs cooperation pact with Sellafield

http://www3.nhk.or.jp/nhkworld/english/news/20140930_19.html

Tokyo Electric Power Company has signed an agreement with a British company aimed at gaining technical knowhow in decommissioning nuclear power reactors.

It will get input from Sellafield in decommissioning its Fukushima Daiichi nuclear plant damaged by the 2011 massive earthquake and tsunami. The utility is facing challenges including the buildup and leakage of contaminated water, as well as the management of working conditions of 5,700 workers per day.

Sellafield has expertise in decommissioning nuclear reactors and handling nuclear accidents.

In 1957, a fire occurred at a reactor belonging to its predecessor, resulting in the leakage of radioactive materials.

TEPCO hopes that the knowhow provided by Sellafield will help reduce the radiation exposure of its workers. It also hopes for guidance on technical aspects and personnel training related to the analyses of groundwater and seawater.

The agreement is the first of its kind signed by TEPCO with an overseas company.

October 15, 2014

Decommissioning: Further delays

Fukushima decommissioning may be further delayed

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The operator of the crippled Fukushima nuclear power plant has announced plans to begin dismantling the cover of the No.1 reactor building later this month to remove debris.

The work was to begin in July, but had been delayed after radioactive dust from the plant was blamed for contaminating rice paddies in Fukushima when the operator removed debris from the plant's No.3 reactor building in August of last year.

The No.1 reactor building has a cover to prevent radioactive material from spreading. Massive amounts of debris remain inside the building following the hydrogen explosion in March 2011.

The debris blocks work to remove nuclear fuel rods from the spent fuel storage pool inside the building.

The operator, Tokyo Electric Power Company, has been working on ways to stop the spread of radioactive contaminants in nearby areas. It discussed measures with local municipalities.

TEPCO on Wednesday unveiled plans to begin drilling holes in the cover, starting October 22nd, to spray chemicals inside to stop dust from spreading.

The cover will be partially removed in late October to monitor whether radioactive dust will spread.

TEPCO says work to completely dismantle the cover will begin next March, and will be completed more than 12 months later. It says debris removal will begin before October 2016.

The Japanese government and TEPCO initially set a timetable for removing fuel rods from the reactor building after April 2017, but delays are also likely.

October 22, 2014

Starting to remove cover at No.1

Workers drill into a panel of a canopy covering the damaged No. 1 reactor building at the Fukushima No. 1 nuclear power plant on Oct. 22. (Provided by Tokyo Electric Power Co.)

TEPCO starts removal work of cover over damaged Fukushima reactor building

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201410220043

The operator of the crippled Fukushima No. 1 nuclear power plant started dismantling a canopy on Oct. 22 installed over the damaged No. 1 reactor building to prevent radioactive substances from entering the atmosphere.
Workers at the Tokyo Electric Power Co. plant started the operation shortly after 7 a.m. They used a crane-mounted drill to make eight 30-square-centimeter holes in one of the canopy's six massive panels.
After drilling into the 40-meter-by-7-meter panel, the workers sprayed synthetic, anti-scattering resin inside the building to minimize the possibility of radioactive substances being stirred up into the air.
Cameras will also be inserted into the building to survey the vast amount of debris inside.

The structure's walls and roof were severely damaged in a hydrogen explosion on March 12, 2011, after the plant was struck by the Great East Japan Earthquake and tsunami. The cover was erected in October 2011.
After dismantling the canopy, TEPCO plans to remove a large amount of the highly contaminated debris, rubble and dust that remain inside in fiscal 2016 and spent nuclear fuel rods stored in pools in fiscal 2017.
The canopy-removal operation will go into full swing after March 2015, as TEPCO is currently placing priority on the construction of frozen soil walls near the No. 1 reactor building to prevent groundwater from seeping in.
During work to clear debris from the plant's No. 3 reactor building in August 2013, radioactive substances spread and contaminated plant workers on site about 500 meters away.
To obtain consent from local governments for the project, the utility promised to closely monitor radiation levels during the canopy-removal work and provide them with such data.

Work begins toward dismantling building cover at Fukushima plant

http://mainichi.jp/english/english/newsselect/news/20141022p2g00m0dm072000c.html

TOKYO (Kyodo) -- The operator of the crippled Fukushima Daiichi nuclear plant began preparatory work to dismantle the No. 1 reactor building's cover Wednesday as a first step toward removing melted fuel.
The cover shrouding the building, damaged by a hydrogen explosion in the 2011 nuclear crisis, was installed following the accident to keep radioactive materials from dispersing.
Tokyo Electric Power Co. plans to finish removing the cover around March 2016. It will then aim to begin cleaning up the debris from the hydrogen explosion and removing spent fuel stored in a pool in the building by the end of March 2018.
TEPCO said the work of removing the melted fuel inside the crippled reactor would begin in 2020 at the earliest, but said it has yet to gain a detailed grasp of the situation inside the reactor and consider the specifics of how the fuel is to be extracted.
On Wednesday morning, TEPCO started making holes in the roof of the building cover in order to insert antidispersal agents to prevent radioactive dust from being scattered. The actual dismantling of the cover will start in March 2015, the utility said.
TEPCO had initially sought to begin preparations to dismantle the building cover by last March, but the plan was delayed due to equipment failure. The plan was delayed again after local residents voiced concern that the company's debris cleanup work at the Fukushima plant may have contaminated rice crops in nearby areas.

Tepco gets ready to dismantle building cover at crippled Fukushima No. 1 reactor

http://www.japantimes.co.jp/news/2014/10/22/national/tepco-gets-ready-to-dismantle-building-cover-at-crippled-fukushima-no-1-reactor/#.VEe0yRanp1s

Kyodo
Tepco began preparatory work on Wednesday to dismantle the cover on the reactor 1 building at the crippled Fukushima No. 1 nuclear plant, as a step toward eventually removing the melted fuel inside.
[…]

30 years? 40 years? Or more?

Scrapping reactors could take 40 years

http://www3.nhk.or.jp/nhkworld/english/news/20141022_31.html

The government and the operator of the Fukushima Daiichi nuclear plant say scrapping its 4 reactors would take 30 to 40 years.

Decommissioning work has progressed furthest at the No.4 reactor, which was offline for regular checks when the disaster hit in 2011.

Nearly 90 percent of the fuel rods stored in its spent fuel pool have been removed. The work is to end this year.

Removal of fuel units from the pool at the No.3 reactor building is to begin in fiscal 2015, and work at the No.1 and 2 buildings in fiscal 2017.

Radiation levels remain extremely high in the No.2 building. Officials say they've yet to make a specific schedule for fuel rod removal there.

Awaiting workers further ahead is the extremely difficult job of removing melted fuel from the No.1 to No.3 reactors.

The operation schedule says such work will start at the No.1 and 2 reactors in fiscal 2020, and at the No.3 in fiscal 2021.

But **workers still do not know where or in what state the fuel lies as a result of the meltdowns at the 3 reactors.**

October 28, 2014

Bad start

Wind gust damages cover at Fukushima reactor

http://www3.nhk.or.jp/nhkworld/english/news/20141028_20.html

The operator of the Fukushima Daiichi nuclear power plant says the cover of a building housing the No.1 rector has been damaged.

Tokyo Electric Power Company says a strong gust of wind moved a machine at around 8:30 AM Tuesday, creating a triangular shaped hole about 1 meter wide and 2 meters long.

TEPCO has been using machinery suspended from a crane to spray chemicals into holes. This is to prevent the dispersal of radioactive dust when dismantling the cover.

The operator says no significant changes in radiation levels were seen at the compound, but work has been suspended.

Officials say the wind speed at the time was about 7 kilometers per hour, which is well below the 36-kilometer-per-hour standard required to suspend work. They say a sudden gust may have moved the machinery.

TEPCO has notified the central and local governments and is considering what steps to take. Officials say they don't know when work can resume, or whether this problem will affect Thursday's plan to remove part of the cover on a trial basis.

October 30, 2014

No1 decommissioning timetable delayed

Fuel removal from Fukushima reactor to be delayed

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The Japanese government and Tokyo Electric Power Company are to revise the timetable for decommissioning the No.1 reactor at the Fukushima Daiichi nuclear plant.

The current timetable calls for the process of removing spent fuel assemblies from the storage pool to begin in fiscal 2017, and removing melted fuel to begin 3 years later.

Government and TEPCO officials are now planning to delay the start of removing spent fuel units until fiscal 2019, or by 2 years, and the start of removing melted fuel till 2025, or by 5 years.

Radioactive rubble which has accumulated inside the No.1 reactor building is hampering fuel removal efforts.

Workers began dismantling the cover of the building this month to remove the debris.

But full-fledged work to dismantle the cover will not take place until March of next year, already resulting in a delay of more than 6 months.

To remove the spent fuel and melted fuel, separate facilities, such as cranes, must be set up on top of the reactor building. This would take more time.

The current timetable says complete decommissioning of the Fukushima Daiichi plant with 4 damaged reactors will take 30 to 40 years.

Fukushima Reactor 1 dismantling to be delayed

http://www.japantimes.co.jp/news/2014/10/30/national/reactor-1-dismantling-delayed/#.VFH13RZ5B1s

Staff Report
In the first-ever delay in the plans to dismantle reactor 1 at Tokyo Electric Power Co.'s stricken Fukushima No. 1 nuclear power plant, the government and the utility have agreed to postpone the

removal of fuel rods from the spent-fuel pool by two years from the initial plans, NHK reported Thursday.
The date of extracting the meltedfuel rods from the reactor core, which suffered a meltdown in the 2011 earthquake and tsunami disaster, will also be delayed by five years, the network said, without naming the source.
NHK attributed the delays to an unexpectedly time-consuming process of removal, which was to startin 2017 for fuel rods that are intact and in 2020 for melted ones.
In the ongoing plant dismantling process, removal of rubble, a necessary step to get at the spent-fuel pools, has taken longer than expected, with the plan to start full-fledged work to expose the reactor building by removing its covering delayed by half a year from the originally planned start in March.

Fuel removal delayed at No.1

TEPCO to postpone nuclear fuel removal at Fukushima No. 1 reactor

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201410300071

A series of delays will push back by years the start of operations to remove spent and melted nuclear fuel from the No. 1 reactor building at the Fukushima No. 1 nuclear plant, sources said.
Tokyo Electric Power Co. and the central government were expected to announce the new schedule at an Oct. 30 meeting of the team in charge of handling the decommissioning process and the radioactive water accumulating at the plant.
Under the original plan, TEPCO was to start removing spent fuel from the No. 1 reactor building in fiscal 2017 and begin lifting out the melted fuel as early as fiscal 2020.
Under the new schedule, spent fuel removal will start in fiscal 2019, while the melted fuel operations will begin in fiscal 2025, according to the sources.
Shortly after the March 2011 Great East Japan Earthquake and tsunami struck the Fukushima plant, nuclear fuel in the No. 1 reactor melted and an explosion rocked the building.
Currently, 392 fuel assemblies remain in the spent fuel pool in the damaged reactor building.
TEPCO earlier this month began dismantling the canopy that was installed over the No. 1 reactor building to prevent the escape of radioactive materials.
But work on the canopy was delayed. TEPCO is now unable to begin full-scale work on dismantling the canopy until March 2015 because other related operations must be completed first, the sources said.
That delay, in turn, will push back the scheduled completion of debris removal work around the No. 1 reactor building to at least fiscal 2016.
The debris stands in the way of installing additional devices, such as cranes, to remove the nuclear fuel.
TEPCO and the government also intend to review plans to remove the nuclear fuel at the No. 2 reactor building.
The utility is currently surveying the inside of the No. 2 reactor building, but high radiation levels have hindered progress of the investigation.
Debris removal work has been suspended at the other damaged reactor, No. 3, since August, when some equipment accidently fell into the fuel storage pool.
The No. 4 reactor was not operating during the earthquake and tsunami. The removal of spent nuclear fuel from the No. 4 reactor building is expected to be completed by the end of the year as scheduled.

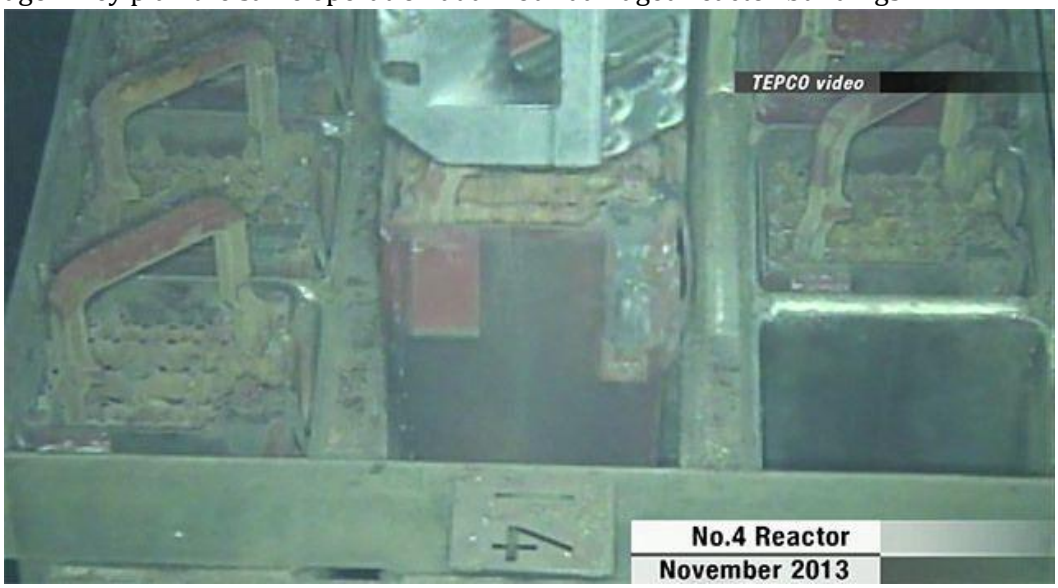
Nuclear Watch: Timetable pushed back

Fukushima Timetable Pushed Back

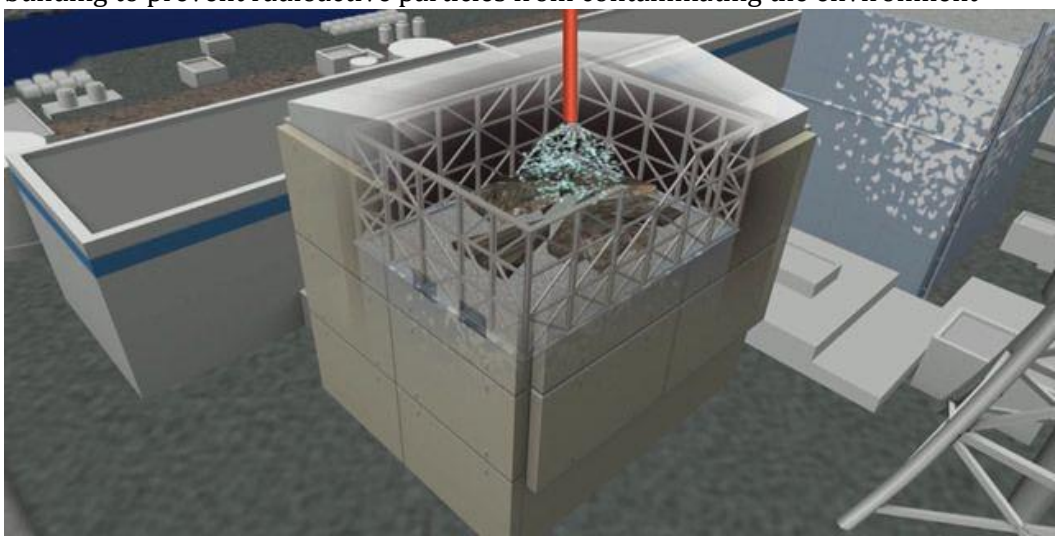
http://www3.nhk.or.jp/nhkworld/english/news/nuclearwatch/20141030.html

The Japanese government and Tokyo Electric Power Company have pushed back the schedule for decommissioning the Fukushima Daiichi nuclear power plant. NHK WORLD's Noriko Okada explains why.

TEPCO engineers started removing spent fuel from the storage pool in the NO.4 reactor building a year ago. They plan the same operation at all four damaged reactor buildings.



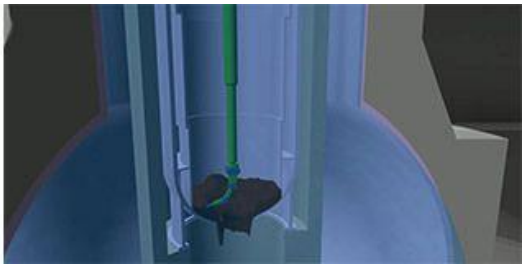
But the work was delayed by 6 months when engineers realized they had to spray chemicals inside the building to prevent radioactive particles from contaminating the environment



The complex engineering challenges continue to grow. The plan put together by TEPCO and the government calls for first removing all the onsite spent fuel before targeting fuel that has melted and solidified inside three reactor vessels.

The current timetable calls for the work to remove highly toxic debris from the reactor buildings to begin in 2020. But TEPCO executives now say this will start 5 years later...in 2025.

One reason for the delay is that engineers believe they'll have to build new facilities, and bring in cranes. They still have not located the debris inside the reactor buildings. Nor do they even know its state.

The government and TEPCO are developing robots to look inside the highly contaminated reactor buildings. They say they need the support of other countries such as the US and the UK.
What does all this mean? Officials initially said decommissioning the plant would take 30 to 40 years. But experts now say it will probably take longer.

October 31, 2014

Removing part of no.1 cover to test antidispersal agents

Part of the cover over No. 1 reactor of Fukushima No. 1 Nuclear Power Plant is removed, revealing massive debris inside the reactor on Oct. 31. (Mainichi)

TEPCO removes part of reactor building cover at Fukushima plant

http://mainichi.jp/english/english/newsselect/news/20141031p2g00m0dm064000c.html

TOKYO (Kyodo) -- The operator of the disaster-hit Fukushima Daiichi nuclear plant on Friday tentatively removed part of the cover shrouding the No.1 reactor building installed in the wake of the 2011 disaster to keep radioactive materials from dispersing.
Dismantling the cover is a first step toward removing spent fuel rods stored in a cooling pool sitting above the reactor, which suffered a meltdown in the disaster, and eventually extracting the melted fuel, Tokyo Electric Power Co said.
A crane removes part of the cover over No. 1 reactor of Fukushima No. 1 Nuclear Power Plant on Oct. 31. (Mainichi)
On Friday morning, plant workers removed a huge panel using a crane to see whether antidispersal agents, inserted last week to prevent radioactive dust from being scattered, are taking effect. No changes in radiation levels have been observed around the plant so far, the company said.
TEPCO will continue observing for a month to make sure radioactive materials are not dispersing and put the panel back again. The utility plans to begin full-fledged work on dismantling the cover next March.
Once the whole cover is removed, TEPCO hopes to first clean debris covering the upper side of the building resulting from a hydrogen explosion in 2011. The company then plans to begin taking out spent fuel rods from the pool in the first half of 2019 at the earliest, which is to be followed by the challenging work of extracting melted fuel inside the reactor.
The No. 1 reactor building cover was installed in October 2011 as an emergency measure to keep radioactive dust from scattering. TEPCO initially planned to begin preparatory work for removing it by the end of last March, but the company was forced to delay the schedule after local residents voiced concern that the decommissioning work at the plant may have contaminated rice crops in nearby areas.

Part of cover removed from Fukushima reactor bldg.

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The operator of the Fukushima Daiichi nuclear plant has removed part of the cover of a reactor building on a trial basis.

The work is aimed at clearing debris as part of preparations for removing nuclear fuel from a spent fuel storage pool. The debris was left by a hydrogen explosion after the 2011 nuclear accident.

Tokyo Electric Power Company began the procedure on Friday morning at the No. 1 reactor building. Using a remote-controlled crane, workers lifted one of the 6 panels of the ceiling, taking about 20 minutes. The procedure is aimed at checking whether any dust is stirred up.

TEPCO plans to remove another panel as early as next week, while monitoring the spread of radioactive materials for about a month.

The utility hopes to begin the full-scale dismantling of the cover in March and start removing the debris in the first half of fiscal 2016.

The dismantling of the cover was initially due to start in July. But the utility delayed the operation following the spread of nuclear materials during the removal of debris at the No. 3 reactor building last year.

TEPCO officials now plan to postpone starting the removal of the spent fuel units by 2 years, to fiscal 2019, and the start of removing melted fuel by 5 years, until 2025.

No.1 reactor: Not until 2025

Removal of melted fuel from Fukushima No. 1 reactor delayed until 2025

http://mainichi.jp/english/english/newsselect/news/20141031p2a00m0na014000c.html

The government and Tokyo Electric Power Co. (TEPCO) announced on Oct. 30 that removal of melted fuel from the No. 1 reactor at the disaster-hit Fukushima No. 1 Nuclear Power Plant would be delayed by five years, until fiscal 2025.

They also announced that work to remove spent fuel from a cooling pool will not begin until fiscal 2019, two years later than originally planned. The delays are the result of the removal of debris and the installation of cranes taking longer than expected.

The announcement marks the first delays in the decommissioning schedule. TEPCO said, however, that the move would not result in an overall delay to the decommissioning process, which is expected to take 30 to 40 years.

The No. 1 reactor houses 392 fuel rods in its cooling pool, while melted fuel remains in the nuclear pressure vessel and reactor containment vessel. In a meeting on Oct. 30, the government and TEPCO decided to adopt a two-step process with separate measures to remove fuel from the cooling pool and melted fuel. First, a cover will be installed on the top floor of the reactor building. After a special crane for the fuel pool removes fuel, then workers will use a container and crane setup to remove melted fuel. The government and TEPCO say that they chose this method because there are many unknown factors in the removal of melted nuclear fuel, and because they hope to remove the fuel from the cooling pool at an early stage.

At the No. 1 reactor, preparations began this month to remove a cover designed to prevent the spread of radioactive materials, so that debris could be removed from the top floor. This process itself was delayed by six months. Because of this, and the fact that the two-step process is laborious, it is believed the government and TEPCO decided to delay the start of fuel removal work.

At the No. 2 reactor, meanwhile, since radiation levels are high and decontamination of the reactor building is difficult, officials have decided to reconsider the method of removing nuclear fuel. Officials are set to decide on a method in fiscal 2016, but there is a high possibility that removal work will fall behind schedule.

In August, work at the No. 3 reactor was suspended after a large piece of debris fell into the cooling pool while debris was being removed from around the pool's edge. Officials plan to remove fuel from the pool next fiscal year, but the outlook for this work is unclear.

It is expected that work to remove fuel from the No. 4 reactor pool will be completed this year.

The decommissioning schedule was established under the Democratic Party of Japan-led administration in December 2011. It was revised in June last year, accelerating the removal of melted fuel by up to a year and a half.

The disaster at the Fukushima No. 1 plant, triggered by the March 2011 Great East Japan Earthquake and tsunami, resulted in core meltdowns at reactor Nos. 1-3. Nuclear fuel has passed through the reactor pressure vessels, and caused damage to the containment vessels. The government and TEPCO plan to fill the containment vessels with water and remove about 450 metric tons of melted fuel. But it remains unknown where the melted fuel actually lies. Furthermore, officials have located only two damaged areas in the containment vessels of the three reactors.

In the Three Mile Island meltdown in the United States, it took six years before the removal of melted fuel was begun, though the pressure vessel was not damaged. Fukushima presents conditions that are far more difficult, and it is unclear when the work can be completed.

Fukushima Daiichi Unit 5 Begins Fuel Removal

http://www.fukuleaks.org/web/?p=14007
TEPCO has begun work to remove fuel from the reactor to the spent fuel pool at unit 5 Fukushima Daiichi. Prior to fuel removal, work was conducted to test equipment and prepare for the work. Fuel will remain in the spent fuel pool.
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141031_04-j.pdf

November 1, 2014

TEPCO removes part of canopy

Workers drill into a panel of a canopy covering the damaged No. 1 reactor building at the Fukushima No. 1 nuclear power plant on Oct. 22. (Provided by Tokyo Electric Power Co.)

TEPCO removes section of radiation cover above Fukushima reactor building

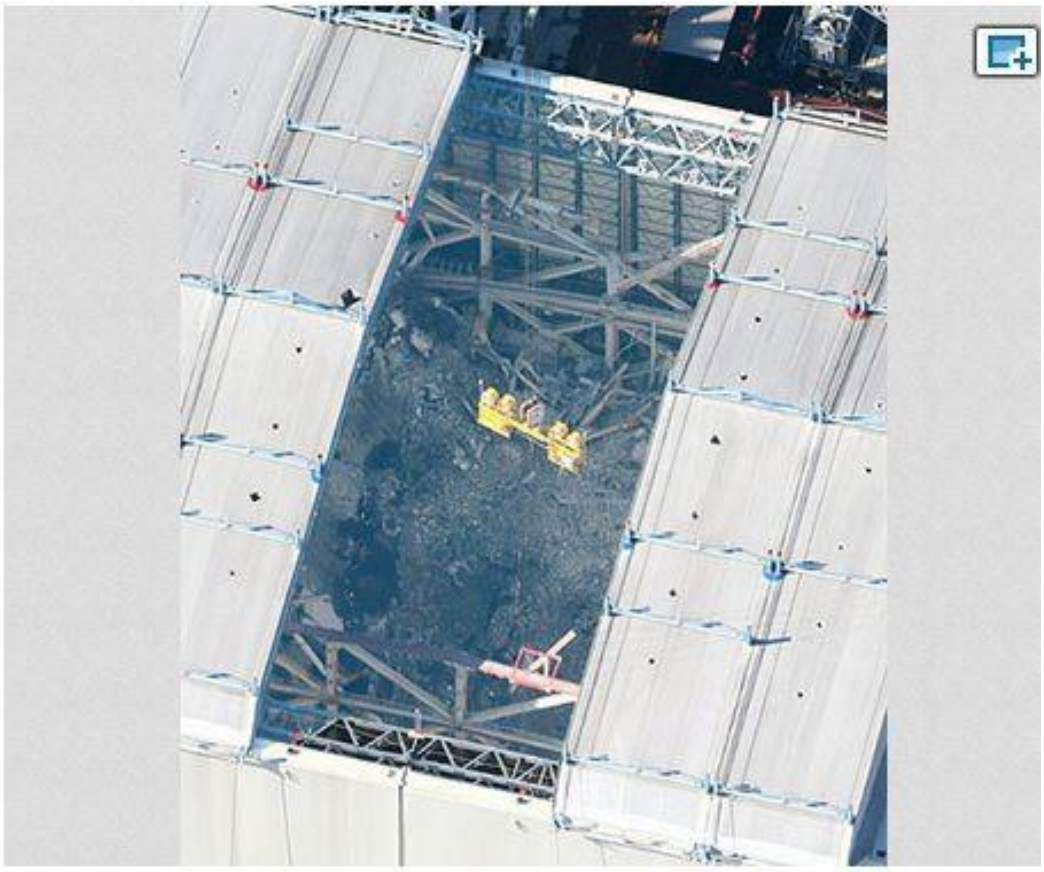
http://ajw.asahi.com/article/0311disaster/fukushima/AJ201411010028

OKUMA, Fukushima Prefecture--Tokyo Electric Power Co. has removed part of the canopy above a reactor building at the crippled Fukushima No. 1 nuclear power plant to gauge the effects of anti-scattering agents pumped inside.

It was the first time in three years that debris inside the No. 1 reactor building was visible from the outside. The structure, which was destroyed in a hydrogen explosion a day after the Great East Japan Earthquake and tsunami on March 11, 2011, was covered with the canopy in October of that year.
The removal on Oct. 31 of one of six panels that make up the canopy is the initial stage in work to remove debris and nuclear fuel from inside the structure.
TEPCO drilled holes into the panel, which measures 42 meters by 7 meters and weighs 32 tons, on Oct. 22. It then sprayed anti-scattering resin inside to prevent radioactive substances from stirring up into the air.
The panel was removed to survey the effects of the resin.
The work was performed by a large crane that slowly hoisted the panel and lowered it to the ground, taking about one hour and 40 minutes.
The panel is scheduled to be returned by the end of November. TEPCO plans to start dismantling the entire canopy on a full-fledged basis in March 2015.

November 10, 2014

Second part of reactor cover removed



The damaged interior of the No. 1 reactor building of the Fukushima No. 1 nuclear power plant can be seen from above, with two of the six panels of a canopy over the reactor building removed, on Nov. 10. (Shiro Nishihata)

TEPCO removes 2nd canopy panel covering Fukushima reactor building

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201411100047

OKUMA, Fukushima Prefecture--**In preparation for clearing debris and eventually removing nuclear fuel from inside**, Tokyo Electric Power Co. on Nov. 10 temporarily removed another panel from the canopy covering a damaged reactor building at the crippled Fukushima No. 1 nuclear power plant.

The removal opened a large hole in the canopy covering the No. 1 reactor building. Debris inside the building were visible from the opening, which is 40 meters long and 14 meters wide, equivalent to one-third the size of the entire roof.

The first of the six canopy panels was removed on Oct. 31.

The utility has been spraying the inside of the reactor building with liquid anti-scattering resin since Oct. 22 to prevent radioactive materials from being stirred up during the dismantling work. The interior of the building will be checked throughout this month.

TEPCO also plans to keep a close eye on radioactivity levels inside the plant grounds and will notify local municipalities if any abnormalities are recorded.

The removed roof panels will be reinstalled as early as within this month, and their full-scale removal is expected to begin in March 2015.

The original roof of the No. 1 reactor building was blown off by a hydrogen explosion that occurred on March 12, 2011, a day after the Great East Japan Earthquake and tsunami struck, triggering the crisis at the nuclear plant. The canopy was installed in October 2011 to contain the spread of radioactive materials.

Another part of cover removed from reactor bldg.

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The operator of the Fukushima Daiichi nuclear power plant removed the second panel from the cover of a reactor building on Monday morning.

Tokyo Electric Power Company is testing to see whether radioactive materials will spread from the building during removal work.

Workers used a remote-controlled crane to lift the second of 6 panels from the top of the No. 1 reactor building.

The first panel was removed last month.

Earlier, workers injected chemicals into holes made in the cover to prevent dust from spreading.

TEPCO says that so far, no monitoring device within the plant compound has detected anything unusual.

The utility says it will continue monitoring for about a month. If no problems are detected, the company plans to begin full-scale dismantling of the cover in March.

TEPCO says that after removing all the panels, it will begin removing debris from inside the No. 1 reactor building. The work is part of preparations for taking out about 400 units of nuclear fuel from a spent fuel storage pool.

TEPCO initially planned to dismantle the cover from July. But it postponed the operation after radioactive dust spread during the removal of debris from the No. 3 reactor building last year.

November 12, 2014

An "unprecedented rate" of decommissioning

World Energy Outlook Warns Nuclear Industry On Decommissioning And Disposal

http://www.nucnet.org/all-the-news/2014/11/12/world-energy-outlook-warns-nuclear-industry-on-decommissioning-and-disposal

The nuclear energy industry needs to be ready to manage "an unprecedented rate" of decommissioning with almost 200 of the 434 reactors that were operating commercially at the end of 2013 to be retired by 2040, a report by the International Energy Agency says.
World Energy Outlook 2014 (WEO), released today in London, says "the vast majority" of these reactor retirements will be in the European Union, the US, Russia and Japan.

The industry will need to manage this unprecedented rate of decommissioning, while also building substantial new capacity for those reactors that are replaced, WEO says.

The IEA estimates the cost of decommissioning plants that are retired to be more than $100 billion.

But WEO warns that "considerable uncertainties" remain about these costs, reflecting the relatively limited experience to date in dismantling and decontaminating reactors and restoring sites for other uses.

Regulators and utilities need to continue to ensure that adequate funds are set aside to cover these future expenses, WEO says.

It also warns that all countries which have ever had nuclear generation facilities have an obligation to develop solutions for long-term storage.

In one scenario examined in WEO, the cumulative amount of spent nuclear fuel that has been generated (a significant portion of which becomes high-level radioactive waste) more than doubles, reaching 705,000 tonnes in 2040.

Today – 60 years since the first nuclear reactor started operating – no country has yet established permanent facilities for the disposal of high-level radioactive waste from commercial reactors, which continues to build up in temporary storage, WEO says.

It says nuclear power is one of the few options available at scale to reduce carbon dioxide emissions while providing or displacing other forms of baseload generation. Nuclear has avoided the release of an estimated 56 gigatonnes of CO2 since 1971, or almost two years of total global emissions at current rates.

Policies concerning nuclear power will remain an essential feature of national energy strategies, even in countries which are committed to phasing out the technology and that must provide for alternatives, WEO says.

In WEO's central scenario, global nuclear power capacity increases by almost 60 percent from 392 gigawatts in 2013 to more than 620 GW in 2040. However, its share of global electricity generation, which peaked almost two decades ago, rises by just one percentage point to 12 percent.

This growth is concentrated in just four countries – China, India, South Korea and Russia. These are markets where electricity is supplied at regulated prices, utilities have state backing or governments act to facilitate private investment.

Of the growth in nuclear generation to 2040, China accounts for 45 percent while India, South Korea and Russia collectively make up a further 30 percent. Generation increases by 16 percent in the US, rebounds in Japan – although not to levels seen before the Fukushima-Daiichi accident – and falls by 10 percent in the European Union.

WEO says despite the challenges nuclear faces, it has specific characteristics that underpin the commitment of some countries to maintain it as a future option. "Nuclear plants can contribute to the reliability of the power system where they increase the diversity of power generation technologies in the system. For countries that import energy, it can reduce their dependence on foreign supplies and limit their exposure to fuel price movements in international markets."

Although the upfront costs to build new nuclear plants are high and, often, uncertain, nuclear power can offer economic benefits by adding stability to electricity costs and improving balance of payments, WEO says.

November 13, 2014

Decommissioning IS expensive

IEA: $100 bil. in costs to retire 200 reactors

http://www3.nhk.or.jp/nhkworld/english/news/20141113_29.html

The International Energy Agency says about **200 nuclear reactors around the world will be retired by 2040**, and that 100 billion dollars will be needed to decommission them.

The IEA issued its world energy outlook on Wednesday.

The report says about 200 of the 434 reactors that were operating, or could be operational, at the end of 2013 are expected to be retired by 2040. It says **most of them are in Europe, the United States, Russia and Japan.**

The IEA estimates the cost to decommission the reactors at about 100 billion dollars. It points out the need for power companies and regulators to secure adequate funds.

The report also says nuclear power helps countries lower their dependence on foreign energy sources and reduce the impact of fuel price movements.

The IEA estimates the world can cut about 4 years' worth of carbon dioxide emissions with increases in nuclear power production in China, India, Russia, the US and other countries.

The IEA also estimates the amount of spent fuel to double over the period. It says **countries are obliged to work out solutions for long-term storage.**

November 17, 2014

Decommission Daini plant

Fukushima Gov. seeks Daini plant decommissioning

http://www3.nhk.or.jp/nhkworld/english/news/20141117_40.html

The new governor of Fukushima Prefecture has called for the decommissioning of the Fukushima Daini nuclear power plant, which is currently offline.

Governor Masao Uchibori met with industry minister Yoichi Miyazawa on Monday for the first time since he assumed the prefecture's top post last month.

Uchibori asked the minister to proceed with work to permanently shut down all the reactors in the prefecture, including those at the Fukushima Daini plant.

The Daini power station, 10 kilometers south of the crippled Fukushima Daiichi station, was not damaged in the March 2011 earthquake and tsunami. But its operation has been suspended since the nuclear accident at the Daiichi station.

Uchibori said major challenges remain in decommissioning the reactors and managing the contaminated wastewater at the Daiichi plant.

Uchibori asked the central government in Tokyo to lead the decommissioning work and reconstruction efforts in Fukushima.

Miyazawa said the central government has no compulsory procedures under which the Daini plant would be closed. He said that plant's operator, Tokyo Electric Power Company, would be the first to make a decision on that matter.

Miyazawa said his priority as industry minister is the decommissioning of the Daiichi plant and controlling the radioactive wastewater there, as well as the reconstruction of Fukushima. He pledged that the government will play a leading role in these efforts.

Mock test

Mock test to retrieve radioactive waste starts

http://www3.nhk.or.jp/nhkworld/english/news/20141117_01.html

Japanese researchers began the first full-scale simulation to develop a technology to remove high-level radioactive waste from nuclear power plants after it has been stored deep underground.

The test, which is aimed to push forward the selection of storage sites, began **at a research institute in Chiba prefecture** near Tokyo. The project is supported by the Japanese government.

The government plans to dispose of high-level radioactive waste by burying it deep underground.

Officials have been trying to find suitable storage sites for this plan.

Experts point out that it may become necessary to retrieve highly radioactive nuclear waste after it is stored underground in the event that new safety concerns arise, or if better disposal technologies are developed in the future.

The test uses mock waste that does not contain radioactive substances. It is buried 4 meters under a floor in a tunnel built inside the research site. It is covered with clay for protection.

Researchers will use 6 cameras to remotely conduct the test because at an actual storage site, workers would be exposed to high-levels of radiation.

They plan to use a hose to spray salt water to break up the clay around the nuclear waste and vacuum the waste with another hose.
The aim is to ease the safety concerns among the public so that the government can move forward with the selection of storage sites.

Other plans include storing nuclear waste inside a capsule and retrieving it with protective clay.

Experts will decide which plan is the best and most practical.

Hidekazu Asano is with the Radioactive Waste Management Funding and Research Center that is conducting the test.

He says that there are many arguments over how to handle nuclear waste, but he wants the public to feel safe by proving that nuclear waste can be retrieved with the technology now available.

Decommissioning of Fukushima Daini

Fukushima Gov. seeks Daini plant decommissioning

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November 27, 2014

Pass on the cost of decommissioning

Gov't eyes system for power firms to tack reactor decommissioning costs to power bills

http://mainichi.jp/english/english/newsselect/news/20141127p2a00m0na014000c.html

The Ministry of Economy, Trade and Industry has started to consider introducing a system in which major power companies can tack costs of decommissioning their nuclear reactors onto power bills for consumers even after the full liberalization of electricity retailing fees scheduled for 2018 to 2020, it has been learned.
An idea has emerged that major power companies pass the costs of decommissioning their nuclear reactors onto the usage fees for those companies that are to transmit and distribute electricity produced by the utilities to households and business establishments after the power generation business is separated from power transmission and distribution operations. The industry ministry intends to pave the way for the major utilities to decommission their nuclear reactors early by letting them recover decommissioning expenses without being affected by price competition that is expected to emerge after the deregulation of the electric power industry.
The major power companies that have nuclear plants have been posting the costs of decommissioning their reactors every fiscal year in installments and tacking the costs onto power bills. In July 2013, the government decided to limit the life of nuclear reactors to 40 years in principle. Thus, the power companies, which had planned to operate their reactors beyond 40 years, are forced to decommission their ageing reactors earlier than planned and move up the schedule for posting the decommissioning costs. Under such circumstances, the power companies could incur huge losses.
The industry ministry estimates that if seven reactors are decommissioned in July 2016 after 40 years in operation, there will be a loss of about 21 billion yen for each reactor. Those power companies, whose finances are deteriorating due to a delay in restarting their reactors, are cautious about posting huge losses, raising concerns that the decommissioning of reactors might not go smoothly. For this reason, the ministry plans to allow the power companies to post costs of nuclear facilities, including decommissioning expenses, in installments over multiple business years so as to prevent their finances from deteriorating quickly.
The ministry is rushing to consider a new system because electricity fees will be fully liberalized around 2018 to 2020 and the current rate system in which power companies are allowed to tack decommissioning costs onto utility bills will be scrapped accordingly. If decommissioning costs are to be tacked onto power bills only from major utility companies after the full liberalization of the electricity retailing market in 2016, emerging start-up electricity retail companies will have advantages in setting electricity fees. If that is the case, the major power companies will lose their

customers, making it difficult for them to recover decommissioning costs. The industry ministry will help the major power companies to decommission their reactors as originally planned by resolving such concerns.

Radiation level much worse than expected even after cleaning up

More difficulty in cleaning up reactor building

http://www3.nhk.or.jp/nhkworld/english/news/20141128_02.html

The government and the operator of the crippled Fukushima Daiichi nuclear power plant say cleaning up a heavily contaminated reactor building is much harder than they had believed.

They have decided to conduct additional decontamination work at one of the reactor buildings before they launch a decommissioning process.

Workers have been scraping off flooring material at the upper part of the No.3 reactor building to remove radioactive substances sticking to the surface.

The operator Tokyo Electric Power Company expected the work to lower the radiation level there to 1 millisievert an hour, a level that will allow people to work there for some time.

But estimates by the operator have found that even after the planned cleaning up, radiation could reach 60 millisieverts an hour in some areas, and over 10 millisieverts in many other areas.

The government and Tokyo Electric Power decided to introduce more measures to reduce exposure. They include laying down steel sheets on floors to block strong radiation as well as scraping off more layers of flooring material.

The operator plans to remove nuclear fuel from the storage pool of the No.3 reactor from the next fiscal year. But it says it's not yet known how the delay in decontamination would affect the schedule.

Removal of nuclear fuel from reactor storage pools is a significant part of the decommissioning process. For reactor No.1, the operator plans to delay the schedule by 2 years to fiscal 2019. For reactor No.2, it says it will compile a plan in 2 years.

December 17, 2014

Who will pay the costs of decommissioning?

Power rates to reflect decommissioning costs even after deregulation

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201412170064

By TOMOYOSHI OTSU/ Staff Writer

Regional utilities will be allowed to pass on costs to consumers for decommissioning nuclear power plants even after the retail sale of electricity to households is liberalized in 2016, according to sources.
The move proposed by the industry ministry reflects concerns that it could be difficult for the utilities to raise funds for decommissioning work if the liberalization produces fierce competition among electricity suppliers, the sources said.
However, the ministry could find itself being criticized for giving favorable treatment to regional electric power companies that have nuclear power plants even though its intention is to make decommissioning go smoothly, the sources added.
Costs for decommissioning nuclear power plants are already added to electricity bills. This is set to continue because liberalization of the market in 2016 will ramp up competition among electricity suppliers, and this could make it difficult for the major electric power companies to generate sufficient profits to carry out decommissioning work.
Companies that will spin off from the major electric power companies between 2018 and 2020 to specialize in transmitting electricity will collect costs for decommissioning work.
These companies, which will still be under the umbrellas of the regional utilities, will add decommissioning costs to electric cable use fees paid by electricity sales companies, which collect electricity bills from individual households.
While the ministry wants all electricity sales companies to shoulder the burden of costs for decommissioning, some of the new firms may decide to specialize in sales of electricity from renewable energy sources to consumers who are opposed to nuclear power generation.
In that event, those companies would sharply oppose being required to bear some of costs for decommissioning work.
To get round the problem, the ministry may decide that only firms selling electricity from nuclear power plants will shoulder the burden.
In the case of a midsized reactor that can generate 800 megawatts of electricity, the costs for decommissioning range from 44 billion yen to 62 billion yen ($377 million to $532 million). The costs include plant dismantlement and radioactive waste disposal.

December 24, 2014

Too expensive to keep them running

Utilities to announce scrapping of 5 old reactors

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Several Japanese nuclear power plant operators are expected to consider announcing plans to scrap reactors that are about 40 years old.

The operators are making the move as the Ministry of Economy, Trade and Industry is set to file an interim report on Wednesday on steps that would make it easier to scrap aging reactors.

The report will include an expansion of the special accounting measures for decommissioning work.

New regulations for nuclear plants introduced last year set the lifespan for reactors at 40 years. Extending their lifespan will require special inspections.

Four operators are considering announcing by next March that they will scrap 5 reactors.

Three of them are in Fukui Prefecture. One is operated by the Japan Atomic Power Company and 2 are run by Kansai Electric Power Company.

A fourth is operated by Chugoku Electric Power Company in Shimane Prefecture and the fifth one is run by Kyushu Electric Power Company in Saga Prefecture.

These reactors have a relatively small output. The utilities apparently think it will not be cost-effective to spend huge amounts on the safety measures needed to keep them running.

Kansai Electric Power Company has 2 other reactors that have been in operation for 39 to 40 years. Their output is large and the utility has started a special inspection to extend their lifespan.

Support recommended to scrap old reactors

http://www3.nhk.or.jp/nhkworld/english/news/20141224_23.html

An expert panel put together by Japan's industry ministry has called for expanding special accounting measures and other steps to help electric power firms scrap old nuclear reactors.

Four utilities may announce by the end of next March that they will decommission 5 reactors. Each is around 40 years old.

The panel on Wednesday released an interim report on what measures are needed for the nation's nuclear power industry after the 2011 Fukushima crisis.

One is to expand special accounting measures for power companies to make it easier for them to scrap aging reactors.

The panel also calls for the reduction of state subsidies paid to host communities.

The panel at the same time notes the need to consider steps to support regional economies after the reactors are closed.

The interim report is expected to help 4 utilities make decisions on 5 old reactors.

One of the reactors is operated by the Japan Atomic Power Company and 2 by the Kansai Electric Power Company. They are in Fukui Prefecture.

The fourth reactor is run by the Chugoku Electric Power Company in Shimane Prefecture, and the fifth one, operated by the Kyushu Electric Power Company, is in Saga Prefecture.

The government's basic energy plan, approved by the Cabinet in April, calls nuclear power a key energy source.

The industry ministry plans to decide on measures for the nuclear industry when they discuss energy sources next year.

"Still a long, rocky road ahead"

NUCLEAR WATCH - One Step Forward

http://www3.nhk.or.jp/nhkworld/english/news/nuclearwatch/20141224.html

The operator of the Fukushima Daiichi nuclear power plant has taken a big step toward decommissioning the complex. Tokyo Electric Power Company has removed all nuclear fuel from the storage pool of the crippled No.4 reactor building. NHK WORLD's Mitsuko Nishikawa talked to experts who say the hardest work is still to come.
Spent fuel pulled out from the reactor is cooled in a storage pool on the upper floor of the reactor building. At this stage, it still emits high levels of radiation. If the spent fuel isn't kept cool, it could trigger a meltdown. TEPCO chose to remove fuel from the No.4 building first for two key reasons.
First, a hydrogen explosion in 2011 weakened the structure, giving rise to fears that the cooling pool could collapse.
Second, radiation levels are lower here than in the buildings where a meltdown occurred.
The fuel assemblies had to be kept in water at all times. Workers used a crane to transfer them to radiation-proof casks. They then lifted the casks out of the building and transported them to a more stable pool in another area of the complex.
The workers moved more than 1500 units of fuel, most of it dangerous spent fuel.

"We're satisfied that we've managed to hit a significant milestone on the road to decommissioning Fukushima Daiichi," says Yoshimi Hitosugi, a spokesperson for TEPCO, who reports that the job was completed without any setbacks.
But the biggest challenge is still to come. TEPCO has to remove more than 1,500 other fuel units from the 3 reactor buildings that were hit by meltdowns.
Radiation levels are so high in those buildings that workers can only stay for a short time.
"We have to lower the level of contamination in the reactor buildings so that workers can do their jobs smoothly and safely," explains Hitosugi. "We also need to start building new facilities for the cranes that will remove the fuel. We will start that work next year."
Dealing with the fuel isn't the only challenge TEPCO faces. The utility is also trying to stop tainted underground water from flowing out of the complex. There's still a long, rocky road ahead.

December 25, 2014

100 specialists sent to help decommissioning

Japan Atomic Power set to deploy 100 specialists to help with Fukushima dismantling

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201412250035

Japan Atomic Power Co. is working on plans to send a team of more than 100 specialists, backed up by robotic technology, to the beleaguered Fukushima No. 1 nuclear power plant to accelerate decommissioning work there.
With more than a decade of experience in dismantling its Tokai power plant in Ibaraki Prefecture from 2001, the nuclear energy firm is expected to make up for delays in decommissioning the Fukushima complex, which went into triple meltdown after towering tsunami generated by the Great East Japan Earthquake swamped the plant in March 2011.
While Tokyo Electric Power Co., operator of the crippled plant, has 300 to 400 employees at the site, there are just 20 workers from outside companies to help safely scrap reactors.
The plant operator finished removing nuclear fuel at the No. 4 reactor on Dec. 20 and is expected to start full-scale dismantling of the more problematic Nos. 1 to 3 reactors soon.
However, due to difficulties in preventing the spread of radioactive substances and removing debris around the reactor, the removal of fuel at the No. 1 reactor is estimated to start two to five years later than originally planned.
Some of the procedures are likely too difficult for TEPCO to undertake on its own, as the utility does not have sufficient experience in decommissioning nuclear reactors.
Workers in protective suits undertook the removal of fuel from the No. 4 reactor in rotation, as radiation levels were relatively low there. However, as radiation levels are much higher at the No. 3 reactor, the removal of fuel from its storage pool has to be conducted using remote-controlled robots.
Such technology requires not only time to develop, but special skills to operate. Japan Atomic Power, which undertook the decommissioning of a commercial nuclear power plant for the first time in Japan, has been using remote-controlled robots to dismantle its Tokai facility. The company believes its experience in the field would be useful in helping TEPCO decommission the Fukushima reactors.
If Japan Atomic Power decides to dispatch a team of experts, it would be the first time for TEPCO to accept about 100 workers from a third-party company.
The nuclear energy company set up an in-house preparation team for the dispatch plan on Dec. 24, sources said, and talks with TEPCO are already under way.

The company plans to flesh out details, including the size of the workforce and what type of support they will provide, by the end of this fiscal year, with the aim of dispatching the team from next fiscal year.
Under the current plan devised by the central government and TEPCO, the decommissioning of the Fukushima reactors is estimated to be completed between fiscal 2041 and fiscal 2051.
(This article was written by Daiki Koga and Tsuyoshi Nagano.)

January 3, 2015

Five to go

Utilities move to decommission five aging nuclear reactors

http://mainichi.jp/english/english/newsselect/news/20150103p2a00m0na004000c.html

Four power companies plan to open talks with municipal governments as early as this month about decommissioning five nuclear reactors that will reach the end of their 40-year operational lifespans in July next year.
The official decisions to decommission the reactors will be made by the end of March this year, as power companies move to get their newer reactors restarted.
The 40-year limit was defined by the revised Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors, which went into effect in July 2013. However, the operational lives of reactors can be extended by up to 20 years with the permission of the Nuclear Regulation Authority (NRA). The reactors have to be inspected, and the extension request has to be made a year or more before the 40-year limit is reached. The revised act included a three-year grace period, which will expire for seven reactors in July 2016.
Out of the seven reactors, the five which power companies are considering decommissioning are: the No. 1 and 2 reactors at Kansai Electric Power Co.'s Mihama Nuclear Power plant; the No. 1 reactor at Chugoku Electric Power Co.'s Shimane plant; the No. 1 reactor at Kyushu Electric Power Co.'s Genkai plant; and Japan Atomic Power Co.'s Tsuruga Nuclear Power Plant No. 1 reactor. Kansai Electric owns the remaining two reactors, the No. 1 and 2 units at Takahama nuclear plant, where inspections to have their lives extended began in December last year.
The five reactors likely to be decommissioned were all forerunners in Japan's nuclear power industry. The No. 1 reactor at the Tsuruga plant, which went online in 1970, was Japan's first commercial light water reactor -- a reactor cooled by normal water. The five reactors are capable of producing from 340,000 to 560,000 kilowatts, while more modern reactors can produce around 1 million kilowatts.
The estimated cost of retrofitting these reactors for continued use is around 100 billion yen, and it is unclear whether the four utilities could recoup that investment even if the reactors went back online. Inspections for getting permission to extend a reactor's operational life are expected to become stricter, and many at the utilities believe it would be very difficult to upgrade the units sufficiently to pass these inspections by the July 2016 deadline.
The government has adopted a policy of reducing Japan's nuclear power dependence, and it is encouraging power companies to make early decisions on whether to decommission aging reactors. However, if a reactor is set aside for decommissioning and loses all its value as an asset, its operator can expect to lose around 21 billion yen. To alleviate this blow, the government plans to introduce a system to spread the losses out over around 10 years, to be recovered through power bills.
If reactors are removed from service, municipalities will also take a hit, losing money they are paid by the national government for hosting the reactors, property tax funds from the operators, and maintenance and plant jobs. In its fiscal 2015 budget, the government plans to expand subsidies for

municipalities hosting nuclear plants to boost local industry and help them escape dependence on the power stations.
Power companies will be keeping an eye on the government's support policies as they work with municipal governments on how to proceed with decommissioning reactors. Decommissioning decisions may also spur further debate about building new reactors to make up for lost generating capacity.

January 11, 2015

Behind decommissioning

5 old nuclear reactors headed for decommissioning scrap heap

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201501110012

Five aging nuclear reactors will be decommissioned in the near future, a move that government officials hope will increase public support for resuming operations at newer reactors.
Executives of four companies in the power generation field are now discussing decommissioning the five reactors that have reached or are nearing 40 years of operation.
Legal changes in the wake of the accident at the Fukushima No. 1 nuclear power plant in 2011 limited nuclear reactors to a 40-year operating life. Utilities will be given a one-time extension of up to 20 years if a reactor meets new tougher safety standards.
The Genkai No. 1 nuclear reactor in Saga Prefecture, operated by Kyushu Electric Power Co., will reach 40 years of operation in October 2015. Company officials have decided to decommission that reactor rather than carry out expensive work to meet the safety standards.
The other six reactors that are nearing or past the 40-year limit are operated by Kansai Electric Power Co., Chugoku Electric Power Co. and Japan Atomic Power Co.
All the companies are expected to make final decisions on decommissioning before the end of the current fiscal year in March.
Kansai Electric is expected to decommission the No. 1 and No. 2 reactors at its Mihama plant, while Chugoku Electric plans to decommission the Shimane No. 1 reactor.
Japan Atomic Power had decided to decommission its Tsuruga No. 1 reactor in Fukui Prefecture even before the Fukushima nuclear accident. That reactor is now in its 44th year of operation. The reactor will stop operations sometime in 2016 and begin being decommissioned.
The seven reactors will all reach at least 40 years of operation in July 2016. If a utility is considering extending the life of such aging reactors for another 20 years, it faces a July 2015 deadline for applying for an extension. That deadline is forcing the four companies to decide if they want to extend operations at a reactor or decommission it.
Kyushu Electric officials are leaning toward decommissioning the Genkai No. 1 reactor because not only is its output relatively small at 559,000 kilowatts, but about 100 billion yen ($843 million) would be needed for additional safety measures to receive approval for extended operations.
Company officials will discuss decommissioning with Saga prefectural government and Genkai town government officials before a formal decision is made by Kyushu Electric's board of directors before the end of the fiscal year.
Kansai Electric operates four of the seven reactors at the 40-year mark. The company is seeking to extend operations at its Takahama No. 1 and No. 2 reactors, which each have about the same output as the combined output of the two Mihama reactors.
Chugoku Electric is currently constructing the No. 3 reactor at its Shimane plant. Executives want to focus on starting up operations of that reactor, and that would mean decommissioning the No. 1 reactor.

Central government officials are considering various measures to encourage the decommissioning of old reactors to gain public understanding for resumption of operations at relatively newer reactors. The Ministry of Economy, Trade and Industry, which oversees the nuclear industry, is considering revising accounting rules to lighten the financial burden on electric power companies that decommission nuclear reactors. The changes are expected to take effect from March.

January 13, 2015

To scrap or not to scrap

Utilities need to decide whether to junk their aging reactors

http://www.japantimes.co.jp/news/2015/01/13/national/utilities-need-decide-whether-junk-aging-reactors/#.VLTNWHt1Cos

JIJI
With some of the nation's 48 idled nuclear reactors expected to resume operation this year, electrical utilities expect their earnings to benefit after years of costly fossil fuel imports to fill the shortfall in power output.
But some of the companies face difficulty deciding what to do with their aging reactors.
The government's basic energy program, adopted in April 2014, calls for allowing the restart of reactors that pass new, tighter safety checks instituted in July 2013.
The Nuclear Regulation Authority has since received screening applications for 21 reactors at 14 power plants across the country.
Of them, the NRA has effectively confirmed that four meet the standards: the No. 1 and No. 2 reactors at Kyushu Electric Power Co.'s Sendai plant in Kagoshima Prefecture, and the No. 3 and No. 4 rectors at Kansai Electric Power Co.'s Takahama plant in Fukui Prefecture.
The NRA is also expected to confirm the safety of the No. 3 and No. 4 reactors at Kyushu Electric's Genkai plant in Saga Prefecture.
Makoto Yagi, chairman of the Federation of Electric Power Companies of Japan and president of Kansai Electric, says that the power industry is determined to "make all-out efforts to reactivate idled reactors early next year."
But it would be difficult to bring all 48 reactors back online. Seven are around 40 years old, the standard life limit.
The government has asked power companies to decide soon whether they will decommission the seven or apply for extensions.
It would cost around ¥100 billion to fix up the seven oldest reactors to the standard required for extended certification. But it would also cost tens of billions of yen to decommission them.
Among other reactors, the No. 2 reactor at Japan Atomic Power Co.'s Tsuruga plant in Fukui Prefecture, and Tohoku Electric Power Co.'s Higashidori plant in Aomori Prefecture, could be forced out of service because of potentially active faults running beneath them.
To keep them in operation would require considerable investment in new safety measures.
With power companies being urged to come up with new long-term business strategies to boost their competitiveness toward the planned full liberalization of the electricity retail market in 2016, they need to select reactors that would be allowed to remain intact and others that should be scrapped, according to industry sources.

January 14, 2015

Customers will pay for decommissioning

Decommissioning costs passed on to customers

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

An expert panel from Japan's industry ministry says all electricity users should continue to bear the cost of decommissioning nuclear reactors.

The plan comes as the ministry is urging power companies to decide soon on whether they will decommission 7 old reactors. The plants have been in use for about 40 years. That's the government-set lifespan for nuclear reactors.

But they say the high cost of decommissioning is delaying the utilities' decision.

The panel on Wednesday approved the special measures to lessen the burden on utilities.

The measures will allow nuclear plant operators to pass on decommissioning costs to all electricity users even after Japan's electricity market fully opens to new firms in 2016.

The plan also allows power companies to divide and process its vast decommissioning costs over 10 years. Otherwise they would have to be dealt with during the first year the reactors closed. These accounting measures will also be applied to nuclear fuel and power generators that will no longer be used.

The ministry plans to formally adopt the measures by the end of March after hearing comments from public.

Reactor decommissioning costs to be passed to all power users

http://www.japantimes.co.jp/news/2015/01/14/business/reactor-decommissioning-costs-to-be-passed-to-all-power-users/#.VLYhMXt1Cos

Kyodo
The Ministry of Economy, Trade and Industry decided Wednesday that the cost to nuclear plant operators of decommissioning reactors should be passed on to all electricity users in principle even after the electricity market is fully opened to newcomers in 2016.
The controversial scheme is aimed at making sure plant operators can recoup the massive expenses involved. **Critics say the plan could undermine fair competition by compelling new entrants with no nuclear power generation to share the decommissioning burden**.
The cost is expected to be included as part of the usage fee of power grids and will be charged by power transmission and distribution companies to be spun off from regional electric companies following the planned market opening.
METI is expected to revise a related ministerial ordinance by the end of March. But it will also consider whether to allow exceptions to the new scheme as some members of an expert panel oppose the system for favoring nuclear power.

January 19, 2015

Decommissioning costs underestimated

Global nuclear decommissioning cost seen underestimated, may spiral

http://www.reuters.com/article/2015/01/19/nuclear-decommissioning-idUSL6N0UV2BI20150119

* Decommissioning cost estimates range widely
* Experts see IEA's $100 billion estimate as too low
* Waste disposal and long-term storage not included
* Adequate provisioning more important than cost estimate

By Nina Chestney and Geert De Clercq

LONDON/PARIS, Jan 19 (Reuters) - German utility E.ON's breakup has led to worries that funds set aside for decommissioning reactors will not suffice, but globally the cost of unwinding nuclear is uncertain as estimates range widely.

As ageing first-generation reactors close, the true cost of decommissioning will be crucial for the future of the nuclear industry, already ailing following the 2011 Fukushima disaster and competition from cheap shale gas, falling oil prices and a flood of renewable energy from wind and solar.

The International Energy Agency (IEA) said late last year that almost 200 of the 434 reactors in operation around the globe would be retired by 2040, and estimated the cost of decommissioning them at more than $100 billion.

But many experts view this figure as way too low, because it does not include the cost of nuclear waste disposal and long-term storage and because decommissioning costs - often a decade or more away - vary hugely per reactor and by country.

"Half a billion dollars per reactor for decommissioning is no doubt vastly underestimated," said Mycle Schneider, a Paris-based nuclear energy consultant.

The IEA's head of power generation analysis, Marco Baroni, said that even excluding waste disposal costs, the $100 billion estimate was indicative, and that the final cost could be as much as twice as high. He added that decommissioning costs per reactor can vary by a factor of four.

Decommissioning costs vary according to reactor type and size, location, the proximity and availability of disposal facilities, the intended future use of the site, and the condition of the reactor at the time of decommissioning.

Although technology used for decommissioning might gradually become cheaper, the cost of final waste depositories is largely unknown and costs might spiral over time. Reactor lifespans are measured in decades, which means financing costs and provisions depend strongly on unpredictable interest rate levels.

"The IEA estimate is, without question, just a figure drawn out of the air. The reality is, the costs are quite phenomenal," said Paul Dorfman, honorary senior research associate at the Energy Institute, University College London.

The U.S. Nuclear Regulatory Commission estimates that the cost of decommissioning in the United States - which has some 100 reactors - ranges from $300 million to $400 million per reactor, but some reactors might cost much more.

France's top public auditor and the nuclear safety authority estimate the country's decommissioning costs at between 28 billion and 32 billion euros ($32-37 billion).

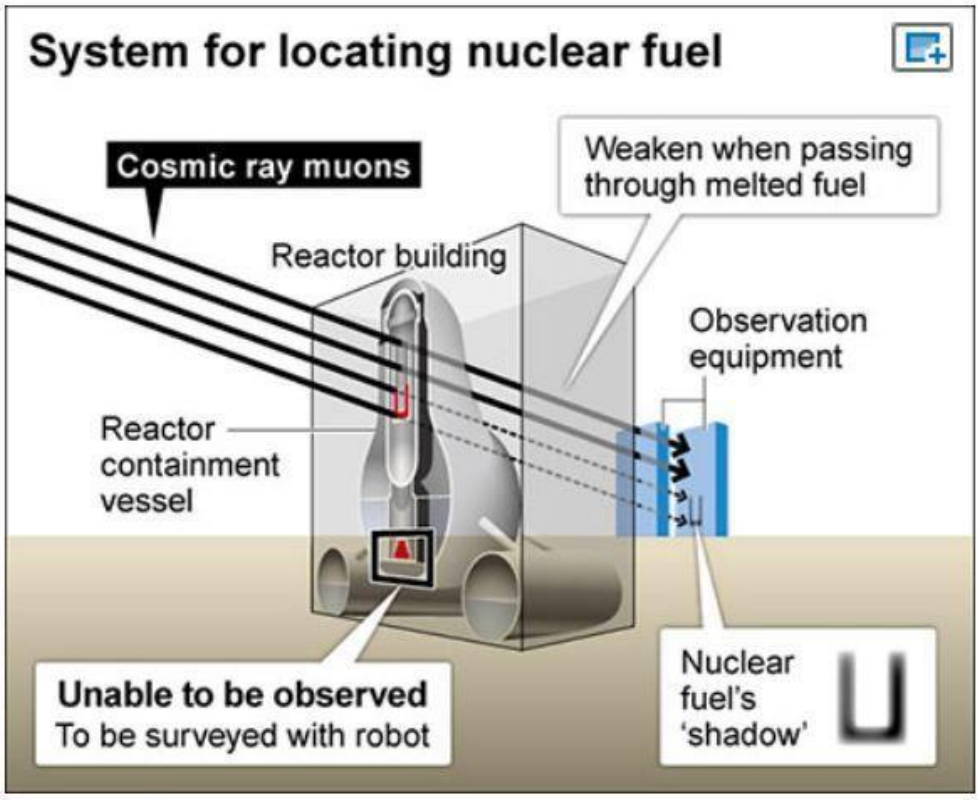
German utilities - such as E.ON, which last month said it would split in two, spinning off power plants to focus on renewable energy and power grids - have put aside 36 billion euros. .
Britain's bill for decommissioning and waste disposal is now estimated at 110 billion pounds ($167 billion) over the next 100 years, double the 50 billion pound estimate made 10 years ago.
Japanese government estimates put the decommissioning cost of the country's 48 reactors at around $30 billion, but this is seen as conservative. Russia has 33 reactors and costs are seen ranging from $500 million to $1 billion per reactor.
The IEA's Baroni said the issue was not the exact cost per reactor.
"What matters is whether enough funds have been set aside to provide for it," he said. ($1 = 0.6588 pounds) ($1 = 0.8601 euros) (Additional reporting by Vera Eckert in Frankfurt, Svetlana Burmistrova in Moscow, Scott DiSavino in New York and Aaron Sheldrick in Tokyo; Editing by Dale Hudson)

January 24, 2015

First try to get an idea of situation inside reactors

TEPCO to rely on cosmic beams to glimpse melted fuel inside Fukushima reactors

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201501240039



The Asahi Shimbun

By TSUYOSHI NAGANO/ Staff Writer
Tokyo Electric Power Co. will use cosmic rays at the crippled reactors at its Fukushima plant to identify sites with melted fuel.

TEPCO will install special equipment to observe muon beams, or particles generated when cosmic radial rays collide with the atmosphere. That will enable it to glimpse inside the reactors, which went into triple meltdown after the March 2011 earthquake and tsunami disaster.
The exercise is intended to generate data that will be useful in deciding how to eventually remove the fuel. Fuel extraction work will be the most difficult phase in decommissioning the beleaguered plant.
While the muons pass through concrete, iron and other construction materials, they become absorbed more easily in high-density materials such as uranium, thereby creating a "shadow." Based on these shadows, TEPCO expects to be able to identify the location and shape of nuclear fuel.
The industry ministry-backed plan will be led by the International Research Institute for Nuclear Decommissioning, an organization comprising TEPCO and atomic facility manufacturers.
They will first study the No. 1 reactor building and compile results by the end of this fiscal year, estimating how much fuel remains in the reactor.
While some experts argue that almost all of the fuel has melted and dropped to the base of the containment vessel at the No. 1 reactor, others say half of it probably remains in the reactor core.
TEPCO and the central government intend to extract the melted fuel after surrounding it with water to block radiation. To do so, the plant operator will need to repair damaged sections of the containers to prevent water leaks.
An industry ministry official said the survey "will provide important data for deciding how much water to inject into the containers."
However, as there are also limitations to the method, the study represents just the first step in ascertaining what is happening inside the stricken reactors.
For instance, nuclear fuel at the base of the container cannot be seen using the muon technique, because the particles are not coming from below the reactors. As the system's resolution is 30 centimeters to 50 cm, small compounds of fuel will also be undetectable.
"Many unknown factors remain, such as what sort of obstacles are at play in the reactor buildings," said Fumihiko Takasaki, professor emeritus at the High Energy Accelerator Research Organization, which was involved in the development of the observation equipment. “We cannot know whether the efforts will eventually prove successful unless we actually try.

January 30, 2015

Should Fukushima Daini be scrapped?

Abe: Whether to scrap Fukushima Daini plant

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Prime Minister Shinzo Abe says Tokyo Electric Power Company will decide whether to scrap reactors at its Fukushima Daini plant. It's about 10 kilometers south of the Fukushima Daiichi plant, which was crippled by the earthquake and tsunami in 2011.

TEPCO's Daiichi complex suffered a meltdown after the earthquake, but the Daini plant did not.

Abe was answering a question from Chizuko Takahashi of the Communist Party during a session of a Lower House committee meeting on Friday.

Takahashi said that the government should focus on bringing the situation at the Daiichi plant under control. She stressed it should not try to resume operations at Daini which have been suspended since the disaster.

The lawmaker urged the government to scrap all of them.

Abe said he asked TEPCO to decommission the 2 Daiichi reactors that escaped serious damage because of their proximity to 4 crippled reactors.

He also noted the priority at Daiichi is to establish a system that focuses on clean-up work.

Abe said that's not the case for reactors at the Daini plant which are located away from the crippled Daiichi plant.

He said the operator will decide whether to decommission Daini. It must also take into consideration the country's future energy policy, measures to meet the new safety standards, and opinions of local people.

January 31, 2015

Disposing of nuclear waste

News Navigator: How is nuclear waste of decommissioned reactors disposed of?

http://mainichi.jp/english/english/perspectives/news/20150131p2a00m0na015000c.html

As old nuclear reactors in the country are considered for decommission, the Mainichi Shimbun answers some common questions readers may have about how such decommissioning and the disposal of nuclear waste take place.
Question: What is the background behind the current talk of decommissioning reactors?
Answer: Under current law, nuclear reactors are generally limited to 40 years of operation -- and power utilities are considering decommissioning as an option for nuclear reactors that are approaching this limit. Standard decommissioning involves extracting spent nuclear fuel from the reactor, decontaminating the inside of the reactor building, and then proceeding with the reactor's dismantling. The whole process takes from 20 to 30 years.
Q: Won't high levels of radioactively contaminated waste emerge during a reactor's dismantling?
A: According to power utilities and other sources, most of the waste that comes out during the dismantling process includes items such as concrete structures that do not need to be treated as radioactive waste. Only around 3 percent of total waste products comprise objects that require handling as radioactive waste -- mainly things including structures inside the reactor such as the pressure vessel that housed its nuclear fuel, and the equipment used for the spent nuclear fuel pool. As an example, around 8,740 metric tons of radioactive waste is estimated to come out from the No. 2 reactor at Chubu Electric Power Co.'s Hamaoka Nuclear Power Plant in Shizuoka Prefecture -- where decommissioning work began in 2009 -- as opposed to 262,800 tons of nonradioactive waste.
Q: How is radioactive waste processed?
A: Except for spent nuclear fuel, the radioactive waste that comes out during decommissioning work has a low level of radiation. Particularly low-level radioactive waste such as filters or workers' clothing is stuffed into barrels, embedded in cement and other materials, and buried less than 20 meters under ground.
This would be the same processing as is already being done at a Japan Nuclear Fuel Ltd. facility in Aomori Prefecture for low-level nuclear waste created by nuclear reactor operations.
On the other hand, objects inside a nuclear reactor -- such as the control rods used to adjust nuclear fission -- are 10 to 100 times more radioactive than low-level waste, and are buried from 50 to 100

meters under ground. Nuclear waste is buried under ground because the bedrock and the soil block radiation.
Q: How will the processed radioactive waste be managed?
A: Shallowly-buried waste will be kept in artificial structures under ground until radiation levels naturally fall -- anywhere from 50 to 300 years. For deeply-buried waste, neither burial locations nor an organization that will retain management responsibility have yet been decided upon. But now that power utilities have started considering reactor decommissions, the Nuclear Regulation Authority began discussions this month geared toward establishing standards for facilities and management of deeply-buried waste. (Answers by Shimpei Torii, Science & Environment News Department)

February 18, 2015

IAEA: Some progress but still many challenges

Fukushima-Daiichi Situation Remains 'Very Complex', Says IAEA Team

http://www.nucnet.org/all-the-news/2015/02/18/fukushima-daiichi-situation-remains-very-complex-says-iaea-team

The situation at the Fukushima-Daiichi nuclear station in Japan remains "very complex", with the increasing amount of contaminated water posing a short-term challenge and the need to remove highly radioactive spent fuel from the reactors that suffered meltdowns "a huge long-term challenge", the International Atomic Energy Agency has said.
The IAEA's third review of decommissioning plans for Tokyo Electric Power Company's (Tepco) Fukushima-Daiichi found an "improved" situation with lower radiation in many areas, but added that many challenges to cleaning up the site remain.

Juan Carlos Lentijo, IAEA director of nuclear fuel cycle and technology, said in a statement that Japan has made significant progress since previous IAEA missions. The situation on the site has improved [and] progressive clean-up has led to reduced radiation dose levels in many parts of the site, he said.

But the situation remains very complex, with the increasing amount of contaminated water posing a short-term challenge that must be resolved in a sustainable manner. "The need to remove highly radioactive spent fuel, including damaged fuel and fuel debris, from the reactors that suffered meltdowns poses a huge long-term challenge," he said.

On the issue of contaminated water, the IAEA team said there has been "persistent underground water ingress" to main buildings and the accumulation of contaminated water on-site. A statement said: "The IAEA team considered the current practice of storing contaminated water a temporary measure and highlighted the need for a more sustainable solution."

The team examined a variety of issues related to decommissioning the station, focusing on the safety and technological aspects of decommissioning, radioactive waste management, control of underground water and accumulation of contaminated water at the site. The team looked at the planning and implementation of pre-decommissioning and decommissioning activities, including removal of spent and damaged fuel. The mission also reviewed progress achieved since two earlier missions carried out in 2013.

In a preliminary summary report delivered to Japanese authorities yesterday, the team acknowledged a number of accomplishments in preparing Fukushima-Daiichi for decommissioning.

Those accomplishments include the creation in 2014 of a new branch of Tepco, called Fukushima-Daiichi Decontamination and Decommissioning Engineering Company, as the only organisation responsible for the implementation of site radioactive waste management and decommissioning activities.

The team said the establishment of the Nuclear Damage Compensation and Decommissioning Facilitation Corporation as a national authority to develop a strategy for the decommissioning demonstrates "the proactive attitude of the government of Japan and Tepco towards addressing the many difficulties at the site".

February 25, 2015

Uncontrolled releases = uncontrolled costs

Fukushima to Vermont Yankee: Uncontrolled releases mean more uncontrolled costs for decommissioning and environmental cleanup

http://www.beyondnuclear.org/japan/2015/2/25/fukushima-to-vermont-yankee-uncontrolled-releases-mean-more.html

Uncontrolled radioactive leaks continue to spring from nuclear power plants around the world and into the news; from the multi-unit wreckage of Fukushima Daiichi in Japan to the recently shuttered Vermont Yankee nuke here in the US. The ongoing pollution of air, land and water means that no one can reliably predict the ultimate cost of decommissioning these radioactive hulks or the quality of the environmental cleanup left to generations decades from now.

Radioactive leaks from known sources and from still unmonitored pathways are streaming from the Fukushima reactor wreckage into the Pacific Ocean. TEPCO recently reported that radioactivity was being monitored in a discharge canal for rain runoff and groundwater from the disaster area that is 70 times greater than any previous recorded levels of contamination. The radioactive leak set off site alarms after detecting high levels of strontium-90 in the drainage ditch. TEPCO has not been able to identify the source of the radioactive spike that could be coming from any number of sources including an expanding tank farm for holding highly radioactive cooling water or the three melted reactor cores somewhere beneath the site still contaminating groundwater. Uncontrolled radioactive leaks from Fukushima have continued to plague the reactor site on the eastern coast of Japan where all six units (the four units destroyed by the accident and the two permanently closed undamaged units) demonstrate the uncertainty and difficulty for bringing this four year-old nuclear catastrophe to a close. Current decommissioning cost estimates run from TEPCO's paltry $125 billion to $500 billion according to the American Society of Mechanical Engineers. One thing is for sure with the ongoing uncontrolled radioactive leaks, there is no reliability for predicting the quality of an environmental cleanup or the ultimate costs of decommissioning the reactor site despite the assurances of the International Atomic Energy Agency that "significant progress" is being made.

Meanwhile back in the US, the Vermont Department of Health disclosed its discovery of strontium-90 contamination in four groundwater wells at Entergy's permanently closed Vermont Yankee nuclear power plant. This radioactive relic of the Atomic Age and de facto high-level nuclear waste site is situated in the Connecticut River valley of Vermont, New Hampshire and Massachusetts. Neither Entergy, the Nuclear Regulatory Commission nor the State of Vermont have located the exact source(s), past or present, of these radioactive leaks to groundwater. The consequences are the same, however. Vermont's latest discovery adds millions of dollars to Yankee's estimated $1.25 billion

decommissioning and dubious cleanup bill; a process that Entergy plans to delay for the next 60 years because they have roughly half the estimated cost in the company's decommissioning "trust" fund. Such decommissioning plans, approved by the NRC, are more akin to dismantling the company's long-term liability than the reactor site.

March 9, 2015

NRA on how to reduce "mid-term risks"

Regulator Outlines Measures To Reduce 'Mid-Term Risks' At Fukushima

http://www.nucnet.org/all-the-news/2015/03/09/regulator-outlines-measures-to-reduce-mid-term-risks-at-fukushima

Japan's nuclear regulator has outlined measures that need to be taken for the reduction of mid-term risks at the Fukushima-Daiichi nuclear station, which was destroyed by an earthquake and tsunami four years ago.

In a document published online, the Nuclear Regulatory Authority (NRA) says that one of the key issues remaining at the facility is dealing with contaminated water that has resulted from water being used to cool the reactors.

The document also gives target dates for removing the remaining spent nuclear fuel and understanding the situation inside damaged facilities.

According to the NRA, the effective radiation dose at the Fukushima-Daiichi nuclear station site boundary is now in line with the natural background radiation levels in Japan of around two to five millisievert a year (mSv/yr), with the NRA aiming to maintain these levels, or lower them, throughout the decommissioning process.

The aim is to manage the effective offsite dose during the decommissioning process by keeping it to an average of 0.2 microsievert per hour (μSv/hr) or less in 2015. This will be done by continuous radiation monitoring and by treating contaminated water. The target for 2016 onwards is an average of 0.1 μSv/hr or less, the document says.

Within 24 hours of the March 2011 accident, radiation dose-rate levels at the site boundary showed more than 1,000 times the normal value of 0.07 μSv/hr or less.

There was a measured peak value of 1,015 μSv/hr at the most exposed point during the first venting of Unit 1 on 13 March. In the days after the accident, the average dose rate reached a range of five to 50 μSv/hr.

For comparison, in most countries, the natural background radiation dose-rate level is in the range of 0.2 to 0.6 μSv/hr (including the natural radon background radiation in buildings), or about two to five mSv/yr.

The NRA document outlines other measures for the reduction of mid-term risks at the site, including dealing with contaminated water, beginning the operation of incineration plants for "miscellaneous radioactive waste" and, in the event of another tsunami, preventing the outflow into the sea of

stagnant, contaminated water.

On the issue of contaminated water, which has been a major problem for station operator Tokyo Electric Power Company (Tepco) since shortly after the accident, the NRA document says targets in 2015 include the continued treatment of highly radioactive water being stored on tanks onsite. The radioactive water mainly stems from water that is being pumped into the reactors to keep them cool.

A new high-performance system for treatment of the contaminated water came online last year. The system, which cleans radionuclides from the water being used to cool the reactors, is a third version of the Alps (advanced liquid processing system) water treatment system, two versions of which are already in place at Fukushima-Daiichi.

The new system will reduce radioactive strontium to non-detectable levels, which will reduce any risk in the event of a leak, reduce offsite radiation doses, and reduce the amount of radiation exposure of workers on patrol, Tepco said.

Another target outlined in the document is to prevent the outflow of contaminated groundwater into the sea by completing an underground impermeable wall on the ocean side of the site. This will be completed in 2015.

A longer-term target, by 2017, is to reduce the volume of contaminated water stored in onsite tanks by treating it and discharging it into to the sea.

Spent fuel has already been removed from Unit 4 at the station, but still needs to be removed from the spent fuel pools at Unit 3 and Unit 1. According to the NRA, the target is to complete spent fuel removal from the Unit 3 pool in 2017 and the Unit 1 pool in 2019.

Experts also need to understand the situation inside damaged facilities at the station. By 2017 Tepco is planning to analyse contamination levels inside the reactor buildings and during 2019 to see inside primary containment vessels and reactor pressure vessels using remote-controlled robots, which Tepco is developing with specialised manufacturers. The aim is to assess the situation in detail in order to prepare for removal of the highly radioactive destroyed fuel elements and melted fuel debris, the so-called corium.

Background

The accident at the Fukushima-Daiichi nuclear plant in northeast Japan happened after the facility was struck by an earthquake and tsunami on 11 March 2011. This resulted in an extended loss of onsite electrical power supplies followed by a series of equipment failures, fuel meltdowns, and releases of radioactive materials.

The station comprised six separate boiling water reactors operated by Tepco. At the time of the earthquake, Unit 4 had been de-fuelled while Units 5 and 6 were in cold shutdown for planned maintenance. The remaining reactors shut down automatically after the earthquake, and emergency generators came online to supply control electronics and coolant systems.

The tsunami broke the reactors' connection to the power grid and resulted in flooding of the rooms containing the emergency generators. Those generators stopped working and the pumps that circulated coolant water in the reactors ceased to work, causing the reactors to begin to overheat. The flooding and earthquake damage hindered external assistance.

Radioactive material was released from the containment vessels of Units 1-3 as the result of

deliberate venting to reduce gaseous pressure, deliberate discharge of coolant water into the sea, and associated uncontrolled events.

Further reading: NucNet Fukushima-Daiichi Fact File (for NucNet subscribers) http://bit.ly/1EdwHyl

The NRA document is online: http://bit.ly/1B4QZYA

March 11, 2015

Decommissioning requires "huge cultural change"

Questions remain over future plan for Japan's aging nuclear plants

http://www.japantimes.co.jp/news/2015/03/11/national/questions-remain-over-future-plan-for-japans-aging-nuclear-plants/#.VQBifeF1Cos

by Eric Johnston
Staff Writer

As the debate about what to do with Japan's aging nuclear reactors intensifies, questions remain about the ramifications of decommissioning plants, and how to tear down the facilities in a way that's efficient, affordable, safe, and that has the support of the local community.

In the United Kingdom, these concerns formed the basis of a policy that has led to the decommission of numerous power stations, two of which began operating in the 1950s.

"There is no set of rules for decommissioning. This is because when you're operating a nuclear power station, you want every day to be the same," said Keith Franklin, of the U.K. National Nuclear Laboratory, and First Secretary (Nuclear) at the British embassy in Tokyo.

"But when you're decommissioning, you want each day to be different than the day before in terms of progress on cleaning things up," he told a news conference in Osaka on Tuesday.

Seven of Japan's 48 commercial reactors are at least 40 years old — in principle their maximum operating life. Another five are at least 35 years old and their fate will have to be decided within the next few years.

Kyushu Electric plans to decommission the 40-year-old Genkai No. 1 plant, while Kepco is expected to shut down the Mihama No. 1 and 2 reactors, both of which are over 40 years old. Chugoku Electric plans to decommission the 41-year-old Shimane No. 1 reactor, while the Tsuruga No. 1 reactor, which is 45 years old and run by Japan Atomic Power, will be closed.

Decommissioning a plant is a decades-long process that does not necessarily immediately involve the most crucial step of tearing down the reactors and hauling away radioactive material.

"During the decommissioning of the Berkeley power station in southwest England, we've left the reactor building standing because it's safer to remove the nuclear material in another 60 years," Franklin said. "We've closed the doors on the reactor building until 2074."

However, he acknowledged publicly visible gestures were important because they could help reassure local communities that the plant was actually being dismantled.

"A skyline change helps garner support for the decommissioning process and for difficult decisions, such as not tearing down and hauling away nuclear materials in reactor buildings," he said.

"In one case, we destroyed the plant's cooling towers, which were not actually a major hazard but could be seen for miles. If you live nearby and you see them come down, you feel progress is being made, and that's more effective than simply telling people about the progress."

Perhaps the biggest lesson the U.K. learned was that effective decommissioning starts with addressing the corporate and bureaucratic culture at a nuclear plant.
« Changing your culture from making something — electricity — to actually taking power stations down requires a huge cultural change on a nuclear site. That's something we're really working on sharing with Japanese nuclear operators," Franklin said.

New plan to remove molten fuel

New method to remove molten fuel considered

http://www3.nhk.or.jp/nhkworld/english/news/20150311_36.html

Experts tasked with developing ways to decommission the Fukushima Daiichi nuclear plant are examining a new method to remove molten fuel from the damaged reactors.

Nuclear fuel in 3 of the plant's 6 reactors melted down in the March 2011 accident. Experts believe some of it penetrated the reactor cores and is sitting at the bottom of the containment vessels.

Officials of the government-backed Decommissioning Facilitation Corporation had planned to fill the vessels with water to block extremely high radiation when retrieving the fuel.

But they say holes and other damage to the vessels have yet to be identified. The water method would be difficult without knowing where the holes are.

The officials say an alternative approach is to make an opening in the side of a containment vessel and remove the fuel without filling it with water. They are mulling this process for No.1 reactor where most of fuel is likely at the bottom of the vessel.

The radiation would reach levels resulting in human death quickly if no protective measures were taken. Remote-controlled robots and technology to block radiation would need to be developed.

Officials aim to come up with a new plan as early as the end of March, including different options for numbers 2 and 3 reactors.

March 12, 2015

Safety measures too expensive: Five reactors to go

Four utilities to decommission five aging nuclear reactors

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201503120041

To avoid paying enormous sums for new safety measures, four electric power companies plan to decommission five nuclear reactors that have been operating for about 40 years, sources said March 12.

The companies are expected to announce their decisions next week and report their plans to the Ministry of Economy, Trade and Industry on March 19.
The utilities are currently coordinating their schedules to explain the plans to local authorities as early as March 18.
The five reactors to be decommissioned will be: the No. 1 and No. 2 reactors of Kansai Electric Power Co.'s Mihama nuclear power plant in Mihama, Fukui Prefecture; the No. 1 reactor of Kyushu Electric Power Co.'s Genkai nuclear power plant in Genkai, Saga Prefecture; the No. 1 reactor of Chugoku Electric Power Co.'s Shimane nuclear power plant in Matsue, Shimane Prefecture; and the No. 1 reactor of the Japan Atomic Power Co.'s Tsuruga nuclear power plant in Tsuruga, Fukui Prefecture.
The outputs of the five reactors range from 340 to 559 megawatts, less than half of those of the latest models.
The utilities judged it would be better to decommission the reactors than spend for additional measures under stricter safety standards for their continued use.
In addition, the government changed accounting rules so that the utilities can spread out the losses from the decommissioning process instead of booking huge one-time losses.
After the accident started at the Fukushima No. 1 nuclear power plant in March 2011, the government stipulated that the operating life span of nuclear reactors is 40 years in principle, and can be extended by up to 20 years only once.
The deadline for applications to extend the operations of the five aging reactors is in July this year.

Trying to keep stress levels down

Nuclear Watch : Stress on The Front Lines of Fukushima Cleanup

http://www3.nhk.or.jp/nhkworld/english/news/nuclearwatch/20150312.html

Four years ago, crews at Fukushima Daiichi in Japan were racing to keep the nuclear plant from spiraling out of control following the earthquake and tsunami. Today, that sense of urgency has dissipated. But the situation remains serious as workers juggle a host of problems as they decommission the facility. Given the risks involved, health concerns and other worries weigh heavily on their minds.
Fifty-one-year-old Mitsuhiro Maeda has been working for more than 20 years as an electrical contractor at the Fukushima Daiichi plant.
Before the accident, he supervised 30 workers and took pride in his contribution to the plant. "I felt we were helping Japan," he recalls. "We were generating electricity, and supporting the country."
Maeda rushed to the plant when he heard about the accident. He worked on restoring external power, which was crucial in cooling the reactors and averting an even bigger disaster. "Someone had to restore power at the Daiichi plant. I just acted because it was my duty," he says.
Working in the aftermath of the disaster, he was exposed to the maximum permissible amount of radiation. Health and safety restrictions prevent him from returning to Daiichi until next year.
Every day about 7,000 workers help decommission the reactors. In heavy protective clothing, they carry out such tasks as collecting and storing contaminated water. However, the decommissioning work is expected to take up to 40 years to complete. Keeping stress levels down and morale up is proving difficult.
Maeda says a change of mood has definitely come over his staff. He also says it's getting harder to find new skilled workers. His company now has only one-third the number of experienced workers it had before the accident. "If it carries on like this, we'll go out of business," he says.

Four years after the disaster, the decontamination of land around the plant continues. But it is hard to predict when places like Maeda's hometown of Namie will be habitable again. He says many residents are losing hope of returning home.
Maeda is helping decommission the reactor out of a sense of duty to his hometown, he says he sometimes loses his faith in the future and is starting to doubt whether it's a good idea to continue his business. We need to figure out how to pass on this responsibility to the next generation. Otherwise I can't see a clear future for the power plant," he says.
Reducing the risk of radiation and improving the working environment is important, but these efforts are not enough to secure workers over the long-term. Those on the front lines, like Maeda, also need to have motivation and hope.

March 17, 2015

Decision to scrap 3 old reactors in Fukui Pref.

Decisions made to decommission 3 aging reactors in Fukui Prefecture

http://ajw.asahi.com/article/behind_news/politics/AJ201503170054

Two utilities on March 17 formally decided to decommission three nuclear reactors in operation for more than 40 years instead of investing in upgrades required under stricter safety standards.
Makoto Yagi, president of Kansai Electric Power Co., informed Fukui Governor Issei Nishikawa that the No. 1 and No. 2 reactors at the Mihama nuclear power plant in his prefecture would be decommissioned.
“We made the decision based on comprehensive considerations, including construction expenses and the period of possible operations,” Yagi said at the meeting. “By placing priority on safety, we want to return the reactor sites to empty plots of land as quickly as possible.”
The No. 1 reactor, with an output of 340 megawatts, went into operation in 1970, while the No. 2 reactor has an output of 500 megawatts and has been in operation since 1972.
Also on March 17, Japan Atomic Power Co. President Yasuo Hamada told Fukui prefectural government officials that the company decided to decommission the No. 1 reactor at its Tsuruga plant in the prefecture.
That reactor started operating in 1970 and has an output of 357 megawatts.
The two utilities will inform the central government of their decommissioning decisions as early as March 19.
The companies realized that it is no longer cost-effective to make the necessary investments to continue running the aging reactors under tougher safety standards established after the 2011 accident at the Fukushima No. 1 nuclear power plant.
The relatively small outputs of the three reactors meant it would be difficult for the two companies to recoup any investments made for the upgrades.
After the Fukushima nuclear accident, the central government also established a clear operating deadline for all nuclear reactors. In principle, the operating life span has been set at 40 years, and it can be extended by up to 20 years only once.
The government had also asked utilities operating the seven reactors that will reach that 40-year operating period by July 2016 to decide whether they will decommission those reactors.
Any utility that decides to extend operations at such old reactors would have to first clear a special safety screening for wear and tear at the reactor. That screening would involve additional costs for the utility above and beyond the investments needed to improve measures against earthquakes and tsunami.

Two other utilities are expected to formally decide to decommission reactors as early as March 18. Chugoku Electric Power Co. is expected to decommission the No. 1 reactor at its Shimane nuclear plant in Matsue, Shimane Prefecture, while Kyushu Electric Power Co. will likely decommission the No. 1 reactor at its Genkai nuclear plant in Saga Prefecture.
On March 17, Kansai Electric Power also submitted safety screening applications to the Nuclear Regulation Authority for the resumption of operations at three other reactors that have been in operation for close to 40 years.
The applications will be made for the No. 1 and No. 2 reactors at the Takahama nuclear plant in Fukui Prefecture as well as the No. 3 reactor at the Mihama nuclear plant.
The two reactors at Takahama have been in operation since 1974 and 1975, and both have outputs of 826 megwatts. The Mihama No. 3 reactor began operations in December 1976 and has an identical output.

Utilities decide to scrap 3 nuclear reactors

http://www3.nhk.or.jp/nhkworld/english/news/20150317_19.html

Two nuclear power plant operators in Japan have decided to scrap 3 reactors that are older than the government's recommended age limit of 40 years.

The closures will be the first since the Fukushima nuclear accident in 2011, aside from those at the crippled Daiichi plant.

Board members of Kansai Electric Power decided on Tuesday to decommission the No.1 and No.2 reactors at the company's Mihama plant in Fukui Prefecture. President Makoto Yagi has visited the prefectural office to report the decision.

In addition, the board of Japan Atomic Power has decided to scrap the No.1 reactor at the company's Tsuruga plant, which is also in Fukui.

The government set the general 40-year-limit after the accident at the Fukushima Daiichi nuclear plant in 2011.

Two more utilities, Kyushu Electric and Chugoku Electric, are set to formally decide on Wednesday to scrap one reactor each.

All the reactors slated for decommissioning have relatively small outputs that apparently do not justify the costs of updating.

New government regulations require utilities to introduce robust and costly safety measures in order to resume operations. All nuclear reactors in Japan remain offline.

Operators opt to scrap 3 old nuclear reactors at Fukui plants

http://mainichi.jp/english/english/newsselect/news/20150317p2g00m0dm064000c.html

OSAKA (Kyodo) -- The operators of two nuclear power plants in Fukui Prefecture decided Tuesday to scrap three old reactors, the industry's first response to a 2013 government regulation against reactors running for over 40 years amid public safety concerns in the wake of the Fukushima disaster.

Kansai Electric Power Co. decided at a board meeting to decommission the Nos. 1 and 2 reactors at its Mihama nuclear power plant, while Japan Atomic Power Co. also decided to scrap the No. 1 reactor at its nearby Tsuruga nuclear plant.
But Osaka-based Kansai Electric also applied to the Nuclear Regulation Authority for a screening process on other reactors that are around 40 years old -- the No. 3 Mihama reactor and Nos. 1 and 2 units at the Takahama plant elsewhere in Fukui -- in hope of gaining the regulator's safety clearance, a prerequisite for their restart.
Kansai Electric President Makoto Yagi explained the shutdown plan for the two Mihama reactors to Fukui Gov. Issei Nishikawa the same day.
A regulation brought in following the March 2011 nuclear catastrophe at Tokyo Electric Power Co.'s Fukushima Daiichi plant forbids nuclear reactors from operating for more than 40 years in principle, but they may be allowed to continue operating for up to 20 more years if the operators make safety upgrades and the unit passes the regulator's screening.
Kansai Electric had considered attempting to restart the two Mihama reactors, but apparently judged that the cost of refitting them was not feasible given their relatively small output of 340 million and 500 million watts, respectively.
Two other utilities -- Chugoku Electric Power Co. and Kyushu Electric Power Co. -- are also expected to decide at board meetings on Wednesday to scrap their aging No. 1 reactors at the Shimane plant in Shimane Prefecture and the Genkai plant in Saga Prefecture.
The four electric utilities are expected to submit notifications of their decisions to the Ministry of Economy, Trade and Industry on Thursday.
The Japanese government is pushing for the restart of nuclear power plants, all shuttered in the wake of the 2011 Fukushima disaster. By closing at least some aging reactors and carrying out safety screening of every reactors before it is allowed to go back online, the government aims to reassure a Japanese public still wary of nuclear power's risks.

Operators to scrap three old reactors in Fukui

http://www.japantimes.co.jp/news/2015/03/17/national/three-aging-nuclear-reactors-in-fukui-prefecture-to-be-scrapped/#.VQg1IOF1Cos

Kyodo
The operators of two nuclear power plants in Fukui Prefecture said Tuesday they will scrap three old reactors, the first such move since a 2013 government regulation spelled out the steps required to keep reactors running beyond their planned 40-year service life.[…]

Nuclear reactors to be decommissioned

http://www3.nhk.or.jp/nhkworld/english/news/20150317_01.html

Two nuclear power plant operators in Japan are planning to scrap 3 reactors that are older than the government's recommended age limit. The reactors are located in Fukui Prefecture, central Japan.

Following the accident at Fukushima Daiichi in 2011, the government set a lifespan of 40 years, in principle, for reactors. The Ministry of Economy, Trade and Industry has urged operators to consider decommissioning reactors that have already surpassed that age.

Kansai Electric Power Company has apparently decided to scrap the No.1 and No.2 reactors at its Mihama nuclear power plant. Japan Atomic Power Company is planning to shut down the No.1 reactor at its Tsuruga plant.

The operators will finalize their decisions at board meetings on Tuesday. They will convey the outcomes to local leaders, including the prefectural governor.

The cost of meeting new safety requirements in order to keep operating the reactors is likely a factor. The reactors have relatively small output that would not justify the expense.

If the decisions to scrap the reactors are confirmed, the reactors will be the first aside from Fukushima Daiichi to be dismantled since the 2011 nuclear disaster.

The operators plan to pass their decisions on to the ministry on Thursday if local municipalities accept the closures. Two other utilities, Chugoku Electric Power Company and Kyushu Electric Power Company are also considering scrapping outdated reactors.

Store waste but where?

Nuclear waste a challenge in decommissioning

http://www3.nhk.or.jp/nhkworld/english/news/20150317_15.html

Decommissioning nuclear reactors takes decades, and generates tons of radioactive waste. But storage sites for such waste have yet to be secured in Japan.

2 Japanese utilities announced on Tuesday that they would scrap 3 reactors in Fukui Prefecture, central Japan.

Aside from these and the reactors at the disabled Fukushima Daiichi plant, 3 other reactors in Shizuoka and Ibaraki prefectures are in the process of being decommissioned.

In Shizuoka, work started in 2009 on permanently shutting down 2 reactors that belong to Chubu Electric Power Company's Hamaoka plant. The entire process is expected to take 28 years.

Workers have already removed nuclear fuel. They are now decontaminating the facilities to minimize radiation exposure during the dismantling work.

They will begin dismantling peripheral facilities from as early as April before taking down the reactors. The outer building will be the last to be pulled down.

The Federation of Electric Power Companies estimates that if all 57 reactors in Japan are scrapped, it would generate about 450,000 tons of low-level radioactive waste. The country has no facility to dispose of such waste.

Chubu Electric on Monday applied to the government to store waste with very low radiation levels within the Hamaoka plant for the time being. Shizuoka Prefecture officials gave their nod to the plan, but warned that they won't tolerate keeping the waste there forever.

Scrapped reactor vessels and other types of waste with relatively high radiation levels are to be stored in facilities built 50 to 100 meters underground. But again, there is no prospect of securing sites for the storage.

Japan's government has also made no progress on finding disposal sites for high-level radioactive waste that's produced during the processing of spent nuclear fuel.

Tour of Fukushima Daiichi organised for foreign officials

Participants in U.N. forum interested in cost of decommissioning Fukushima plant

http://mainichi.jp/english/english/newsselect/news/20150317p2a00m0na015000c.html

FUKUSHIMA -- The Fukushima Prefectural Government and the Resources and Energy Agency of the Ministry of Economy, Trade and Industry led foreign government officials on a tour of the crippled Fukushima No. 1 Nuclear Power Plant on March 16 as part of the U.N. World Conference on Disaster Risk Reduction in Sendai.

Seven people, including government officials from the United States, Brazil and two other countries took part in the tour. A Mainichi Shimbun reporter accompanied them as they observed scenes -- including work to decommission the nuclear reactors -- from inside a bus. The participants appeared to have a great interest in what was happening to the nuclear facility as they posed numerous questions to organizers of the tour, including an official of Tokyo Electric Power Plant (TEPCO), who served as their tour guides.

The tour was planned by officials who wanted participants to observe the progress being made in efforts to decommission the nuclear plant. After being briefed on how TEPCO has responded to the nuclear disaster, the participants headed to the crippled nuclear power station by bus. When entering the "difficult-to-return zone" in the Fukushima Prefecture town of Okuma, they intently gazed at the street, which showed no sign of life.

In about 30 minutes, the participants arrived at the entrance of the nuclear power plant, where they put on masks and radiation dosimeters. The bus then took them past tanks containing contaminated water to the No. 4 reactor at the plant.

The airborne radiation dose detected by equipment carried by a TEPCO official started rising gradually from 20 microsieverts per hour. When the group approached the No. 4 reactor, the dose rose to the day's high of 50 microsieverts per hour. The participants visited the No. 5 and 6 reactors, which had avoided hydrogen explosions, as well as a building housing equipment that removes radioactive substances from contaminated water. They also observed workers engaged in decommissioning the plant.

After the tour, the participants asked a number of questions about the cost of decommissioning the nuclear plant, the number of workers there and measures being taken to manage workers' radiation exposure.

A 33-year-old risk management consultant from France, who said he had joined the tour because he wanted to know how the Japanese government and TEPCO had been responding to the nuclear disaster, said he came to understand that problems were being resolved toward decommissioning the crippled nuclear power station. A 57-year-old Austrian government official, on the other hand, said he was having various thoughts about the nuclear plant, including whether there were sufficient funds to decommission it. He also said he was wondering why Japan was trying to reactivate idled nuclear reactors in the country even though people were able to live without nuclear reactors in operation.

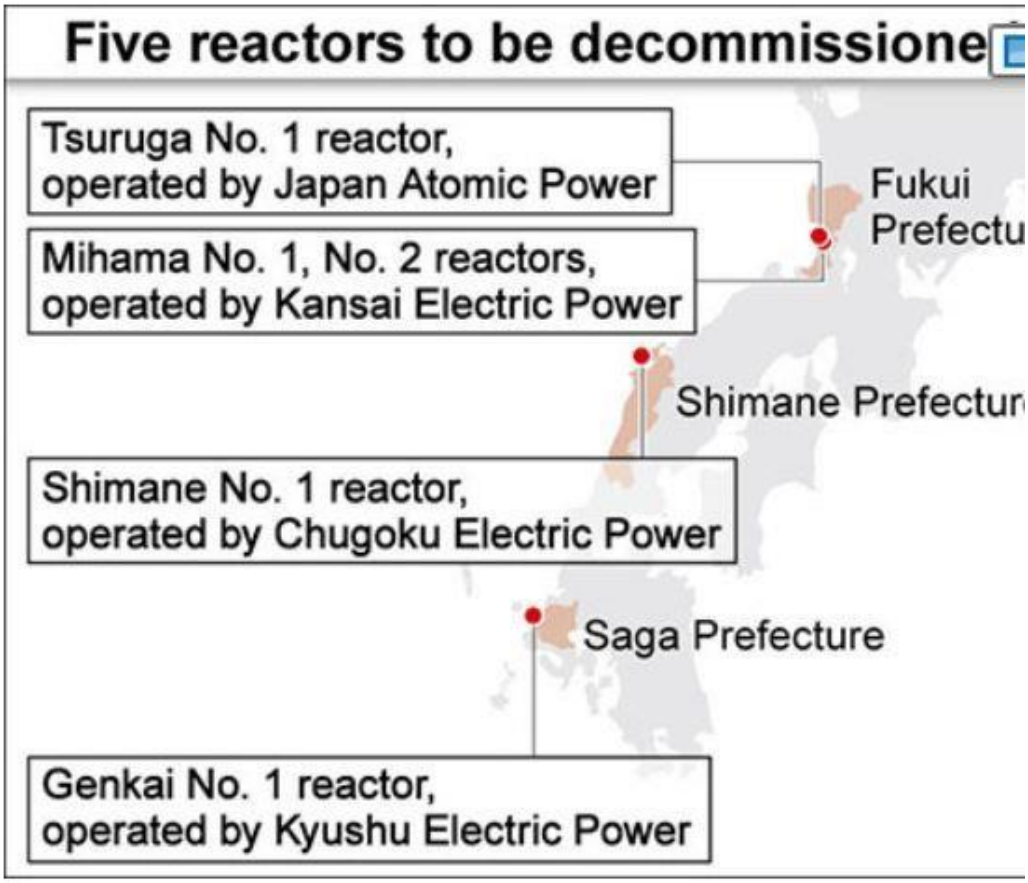
Personal dosimeters showed that the participants were exposed to radiation ranging from zero microsieverts per hour to 10 microsieverts per hour.

March 18, 2015

Decisions to scrap 5 reactors confirmed

More reactors to be decommissioned for a total of 5

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201503180040



Two more aging nuclear reactors are to be decommissioned in addition to three that utilities said had outlived their service life.

Kyushu Electric Power Co. announced March 18 it has decided to decommission the No. 1 reactor at the Genkai nuclear power plant in Saga Prefecture, while Chugoku Electric Power Co. said it will mothball the No. 1 reactor at the Shimane nuclear plant.

The reactors have been in operation for close to 40 years.

The move follows an announcement the previous day by Kansai Electric Power Co. and Japan Atomic Power Co. to decommission three reactors.

The four companies will notify Yoichi Miyazawa, the economy, trade and industry minister, of their decision as early as March 19.

The decommissioning will be the first since the central government established a 40-year operating life for nuclear reactors following the triple meltdown at the Fukushima No. 1 nuclear power plant in March 2011.

The status of the three reactors owned by Kansai Electric Power and Japan Atomic Power will be considered as under decommissioning from April 27. The March 18 decision will reduce the total number of nuclear reactors in Japan to 43.
The five reactors to be decommissioned all had relatively small outputs, which meant the expenses required to meet tougher safety standards would not likely have been recouped even if the reactors had their operating lives extended for 20 years, the maximum allowed under new government rules.
Makoto Yagi, president of Kansai Electric Power Co., and Japan Atomic Power Co. President Yasuo Hamada met separately on March 17 with Fukui Governor Issei Nishikawa and explained their decisions to decommission the three reactors in Fukui Prefecture.
Kansai Electric Power also submitted applications with the Nuclear Regulation Authority on March 17 for safety screenings that would be needed to resume operations at the Takahama No. 1 and No. 2 reactors in Fukui Prefecture, along with the No. 3 reactor at the Mihama nuclear plant, also in Fukui.
Although those three reactors also have been in operation for close to 40 years, their outputs of 826 megawatts each were considered sufficient to warrant the additional investment needed to meet tougher safety standards.
Three reactors are already undergoing decommissioning: the Tokai plant in Ibaraki Prefecture owned by Japan Atomic Power, along with the No. 1 and No. 2 reactors of the Hamaoka nuclear plant in Shizuoka Prefecture, overseen by Chubu Electric Power Co.

2 more power companies decide to scrap aging nuclear reactors

http://mainichi.jp/english/english/newsselect/news/20150318p2g00m0dm043000c.html

FUKUOKA (Kyodo) -- Kyushu Electric Power Co. and Chugoku Electric Power Co. decided Wednesday to decommission aging reactors, following a similar move the previous day by the operators of two nuclear power plants in Fukui Prefecture amid safety concerns in the wake of the 2011 Fukushima nuclear crisis.
Kyushu Electric's board decided to scrap the No. 1 reactor at the Genkai plant in Saga Prefecture, southwestern Japan, ahead of the 40th anniversary in October of the start of its operation.
Chugoku Electric Power Co. decided to decommission the No. 1 reactor at the Shimane plant in Matsue, western Japan, on the Sea of Japan coast, which is more than 40 years old.
A regulation brought in following the March 2011 nuclear disaster at Tokyo Electric Power Co.'s Fukushima Daiichi plant forbids nuclear reactors from operating for more than 40 years in principle, but they may be allowed to continue operating for up to 20 further years if the operators make safety upgrades and the unit passes the regulator's screening.
Operators of aging plants are facing a tough decision as huge amounts of additional investment are needed to meet the new safety requirements to keep reactors operating beyond 40 years.
On Tuesday, Kansai Electric Power Co. and Japan Atomic Power Co. decided to scrap a total of three old reactors.
The presidents of Kyushu Electric and Chugoku Electric are scheduled to report their decisions to local governments hosting the plants.

Japan utilities to scrap 2 more nuclear reactors

http://www3.nhk.or.jp/nhkworld/english/news/20150318_20.html

Two Japanese utilities plan to scrap one nuclear reactor each, as they are near the government recommended 40-year age limit.

This brings the number of reactors in the country slated for decommissioning after the 2011 nuclear

disaster to 5, in addition to those at the crippled Fukushima Daiichi plant.

Board members of the Kyushu Electric Power Company decided on Wednesday to decommission the No.1 reactor at their Genkai plant in Saga Prefecture.

The board of Chugoku Electric Power Company decided the same day to scrap the No.1 reactor at their plant in Shimane Prefecture.

Both reactors are relatively smaller in capacity and considered not worth the costs of upgrading.

Government regulations introduced after the accident at Fukushima Daiichi 4 years ago require costly safety improvements before utilities can restart reactors.

All nuclear reactors in Japan remain offline.

Decommissioning: Both sides of the coin

Mothballing nuclear reactors a mixed blessing for local communities

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201503180050

Having lived for decades in close proximity to nuclear reactors that brought a windfall of benefits, local host communities reacted with mixed feelings to decisions to decommission a handful of aging facilities.
Mihama in Fukui Prefecture learned on March 17 that Kansai Electric Power Co. had decided to mothball the No. 1 and No. 2 reactors of the Mihama nuclear power plant because they had reached the end of their service life.
The town, with a population of 10,000, reaped huge tax grants from the central government over the years as compensation for hosting the facility.
Shizuo Shoyama, 62, lives about a kilometer away from the Mihama plant.
"I really don't want the company to simply say 'With decommissioning, this means goodbye,'" he said.
Shoyama spent around 40 years doing repair and maintenance work at the plant until he retired two years ago. The company he worked for has close ties to Kansai Electric Power.
Construction on the No. 1 reactor began when Shoyama was attending junior high school. Looking back on that period, he said there was a proliferation of small inns where workers stayed, as well as a sharp increase in tourists to the region.
"I hope Kansai Electric Power will think about what can be done for the future economic development of our community, with which it has enjoyed such a long period of co-existence and co-prosperity," Shoyama said.
Others in Mihama hope the decommissioning will serve as a catalyst to move away more fully from a dependence on nuclear power generation.
Teruyuki Matsushita, a former member of the Mihama town assembly who now operates a nature facility, said the decommissioning presented an opportunity to develop the local economy so the community does not have to depend on nuclear energy.
In this regard, Matsushita, 66, said local farm produce and seafood should be more fully utilized. He began supplying local produce to an "izakaya" bar chain in Tokyo from 2014.
"If we had a strong local industry, there would have been no need to accept nuclear plants and live with the dangers they pose," he said. "It's time to devote our efforts to community building once again."

The mayor of Mihama, Jitaro Yamaguchi, met March 17 with Hideki Toyomatsu, an executive vice president at Kansai Electric Power, to ask for the company's continued assistance in providing local employment.
The city of Tsuruga in Fukui Prefecture, where the No. 1 reactor at the Tsuruga plant operated by Japan Atomic Power Co. will be decommissioned, also is heavily dependent on nuclear plants for its economic well-being.
Akiko Otani, 72, operates a hotel in Tsuruga, and is concerned that the community will face a serious decline as the population decreases.
When Japan Atomic Power submitted applications in 2004 for the construction of the No. 3 and No. 4 reactors at the Tsuruga plant, Otani negotiated a loan of 140 million yen ($1.2 million) to construct a hotel annex. However, reactor construction was put on hold after the 2011 disaster at the Fukushima No. 1 nuclear power plant.
"The nuclear plant is our lifeline," she said. "I pray that the company will build something that will provide employment to many people."
Local companies that relied on sales to the Tsuruga plant are now looking for new markets on the assumption the facility will be out of operation for a long period or decommissioned.
For example, the Kiko group, which sells machinery and tools, depended on nuclear plants for about 60 percent of its sales until the triple meltdown at the Fukushima facility.
After the nuclear accident, company chairman Hidemune Komori, 67, decided to review that dependence on nuclear plant-related sales and set up a subsidiary in Vietnam, which is buying Japanese nuclear technology, as part of a plan to increase sales to foreign companies.
"Our company management will be thrown into disarray unless we develop more options," he said.
In Saga Prefecture, the news of the decommissioning decisions was generally welcomed.
Hideo Kishimoto, the mayor of Genkai, which hosts the Genkai nuclear plant, said: "It is the right decision. I will ask Kyushu Electric Power to ensure the decommissioning work is carried out in a safe and thorough manner once it gets under way."
Kyushu Electric Power decided on March 18 to decommission the No. 1 reactor at the Genkai plant.
Yoshikazu Tsukabe, the mayor of Imari, Saga Prefecture, had called for consultations with neighboring municipalities before any decision is made on resuming operations at nuclear plants. Imari lies within a 30-kilometer radius of the Genkai plant.
In a statement welcoming the decommissioning decision, Tsukabe noted that aging reactors pose a higher risk of accidents.
Saga Governor Yoshinori Yamaguchi weighed in by saying, "It is the thinking of the prefectural government as well as my own opinion that dependence on nuclear energy should fundamentally be lowered as much as possible."
He said the decommissioning decision will help reduce Saga Prefecture's dependence on nuclear energy.

Q & As on decommissioning

http://mainichi.jp/english/english/perspectives/news/20150318p2a00m0na012000c.html

News Navigator: What problems accompany scrapping of nuke reactors?

It's been decided that several old nuclear reactors in Japan will be scrapped. The Mainichi Shimbun answers some common questions readers may have about the nuclear reactor decommissioning process.

Question: How do nuclear reactors get decommissioned?

Answer: First, as a preparatory step, decontamination work on nuclear plant buildings and equipment is carried out while letting spent nuclear fuel cool down. The nuclear fuel will then be removed from the reactors. Outer parts of the reactors get stripped down first, then the decommissioning work proceeds to the reactors' core, and finally, the reactor building is scrapped. The whole process -- from shutting down the operation of a nuclear reactor to the complete decommissioning -- takes almost 30 years.

Q: What are the major problems regarding decommissioning of a nuclear reactor?

A: One of the major problems as we enter the age where many of Japan's nuclear reactors are moving toward the end of their 40-year limit is the handling of the massive amount of radioactively contaminated debris and nuclear waste. The Ministry of Economy, Trade and Industry has estimated that a total of 537,000 metric tons of waste will be generated by scrapping one nuclear reactor that produces 1.1 million kilowatts of power. Of such reactors, the amount of radioactive waste would total about 13,000 tons, but the place to discard the nuclear waste has not been decided. Moreover, for highly contaminated equipment such as the reactor itself, there are no standard decommissioning policies.

Q: What will the nuclear plant operators do then?

A: Japan Atomic Power Co., which is carrying out the decommissioning work of its Tokai nuclear power station in Ibaraki Prefecture, has decided to bury 12,300 tons of nuclear waste that has very small levels of radioactive contamination in the ground at the plant. The company is currently negotiating with the municipal government about the plan. Chubu Electric Power Co. decided this month to temporarily store some 4,000 tons of radioactive waste generated by the No. 1 and 2 reactors of the Hamaoka Nuclear Power Station in Shizuoka Prefecture, currently being decommissioned, on its premises. The decision was made as the company has been unable to come up with a clear plan on where to put the nuclear waste, though it initially sought to pick a permanent disposal site before the decommissioning process began.
Fukui Gov. Issei Nishikawa has urged utilities to move the radioactive waste away from the compounds of the nuclear plants in the prefecture, saying that the grounds should become vacant land after the decommissioning work is completed.

Q: What other tasks are involved in decommissioning nuclear reactors?

A: While nuclear plant operators have to move spent nuclear fuel kept in pools away from the plant before the decommissioning work begins, they don't seem to be able to find a place that will accept the waste. There are no prospects as to when the original destination of the spent nuclear fuel, Rokkasho nuclear fuel reprocessing plant in Aomori Prefecture, will resume its operations, and all of the country's spent fuel pools are getting close to full.
Utilities are considering storing spent fuel in air-cooled casks outside plant premises, but such a project has made little progress as companies face opposition from local residents. (Answers by Yui Shuzo, Science & Environment News Department)

March 28, 2015

Clean-up may take 200 years

Japan faces 200-year wait for Fukushima clean-up

http://www.thetimes.co.uk/tto/news/world/asia/article4394978.ece

The chief of the Fukushima nuclear power station has admitted that the technology needed to decommission three melted-down reactors does not exist, and he has no idea how it will be developed.
In a stark reminder of the challenge facing the Japanese authorities, Akira Ono conceded that the stated goal of decommissioning the plant by 2051 may be impossible without a giant technological leap. “There are so many uncertainties involved. We need to develop many, many technologies,” Mr Ono said. “For removal of the debris, we don’t have accurate information [about the state of the reactors] or any viable methodology…
[The rest of the article is only available to Times' subscribers]

March 31, 2015

In all honesty

Nuclear Watch: Decommissioning Chief Speaks Out

http://www3.nhk.or.jp/nhkworld/english/news/features/201503312108.html

Set back after setback…
We have no idea about the (radioactive) debris
The necessary technology doesn’t exist yet
« I cannot say it’s possible »
« There is no textbook to teach us what to do »
« I cannot promise that i will always make the right decision »

Nuclear Watch on decommissioning

Decommissioning Chief Opens up

http://www3.nhk.or.jp/nhkworld/english/news/nuclearwatch/20150331.html

Yoichiro Tateiwa
The people in charge of decommissioning the Fukushima Daiichi Nuclear Plant have been hit with one setback after another.
They've had to battle leaks of radioactive water, and face accusations of misconduct. It's lost them a lot of public trust, and they're trying to win it back. They still face some major challenges with the decommissioning process.
Tokyo Electric Power Company has created a subsidiary dedicated to tackling those challenges. The company will oversee every step of the decommissioning work.
NHK WORLD's Yoichiro Tateiwa sat down with Naohiro Masuda, the man who leads that company.
Naohiro Masuda is in charge of the entire decommissioning process at Fukushima Daiichi. And he brings valuable experience to the job. He's worked as a nuclear engineer for decades. He's faced criticism for a long delay in letting people know about radioactive water reaching the ocean. TEPCO

announced the leak almost a year after workers discovered it. And Masuda didn't shy away from accepting the blame.
"I focused on finding out where the radioactive water was coming from and why, instead of sharing the information with the public. I greatly regret my decision and I want to apologize for how I handled it."
Naohiro Masuda / President, Fukushima Daiichi Decommissioning Company
Fukushima Daiichi still generates more than 300 tons of radioactive water every day. But Masuda says workers at the plant know how to handle it. He discussed his plan to build a massive ice wall around the plant... to stop any more groundwater getting in... and getting contaminated. Some experts have questioned whether that will work. Masuda says he's confident it will.
"We've done some experiments at the plant on a smaller scale. We built a 40-meter ice wall. And that proved successful. We managed to stop water entering the site. Now we are going to do it on a bigger scale, a 1,500 meter wall. I'm confident this will be just as effective as it was on a smaller scale."
Masuda's engineers have finished removing spent fuel from the No.4 reactor building. He says the next step is to remove spent fuel from the No.3 reactor building.
"A hydrogen explosion left the number 3 reactor building full of radioactive rubble. We've finished removing it. But radiation levels are still extremely high. That's why we have to work remotely. We've built cranes to do that work. We're just waiting for the workers to finish cleaning up around the building so we can bring the cranes in."
Masuda says radiation in some areas of the crippled reactor buildings is still so high that workers can only stay there for a few minutes. The hardest part of decommissioning the plant will be removing the fuel that's cooled and turned into highly radioactive debris.
"We have no idea about the debris, we don't know its shape or strength. We have to remove it remotely from 30 meters above. But we don't have that kind of technology yet. It simply doesn't exist."
Experts say workers will have to keep the debris submerged in water to prevent radiation from being released. But Masuda says that's not as easy as it sounds.
"We still don't know whether it's possible to fill the reactor containers with water. We've found some cracks and holes in the three damaged container vessels. But we don't know if we've found them all. If it turns out there are other holes, we might have to look for some other way to remove the debris."
The government wants that work to begin in 2020. I asked Masuda how confident he is that he can hit that target and his answer was surprisingly candid.
"It's a very big challenge. Honestly speaking, I cannot say it's possible but I also do not wish to say it's impossible."
I also asked Masuda what he needs most for the operation to succeed.
"That's hard to say, but probably experience. How much radiation exposure can people tolerate? What kind of information do residents in the area need? There is no text book to teach us what to do. I have to make decisions every step of the way. And I must be honest with you... I cannot promise that I will always make the right decision."

April 9, 2015

Flooding or not flooding?

Plans to remove melted nuclear fuel

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

New methods may be used to remove melted fuel from the crippled reactors at the Fukushima Daiichi nuclear plant.

The government-backed entity overseeing the plant's decommission says engineers are exploring ways to remove the fuel debris without flooding the containment vessels with water.

In the new methods, the melted fuel could be removed from the top of the reactor - or through a hole made on the side of the containment structure.

The Nuclear Damage Compensation and Decommissioning Facilitation Corporation disclosed its strategic plan for decommissioning technologies on Thursday.

Removal of melted fuel is considered one of the toughest challenges in the decommissioning process, which is expected to take up to 40 years.

The plan says the new methods will be considered in addition to the conventional use of water to shield workers from high levels of radiation.

It says the flooding method faces significant challenges, including plugging leaks in the containment vessel, and ensuring its quake resistance during the process.

The plan also warns that in the new methods, high levels of radiation could affect not just workers but robots and other machines.

And steps must be taken to prevent radioactive materials from spreading in the air.

The Japanese government and the plant's operator, Tokyo Electric Power Company, expect to choose a specific method by March 2017 after further study into the state of the melted fuel.

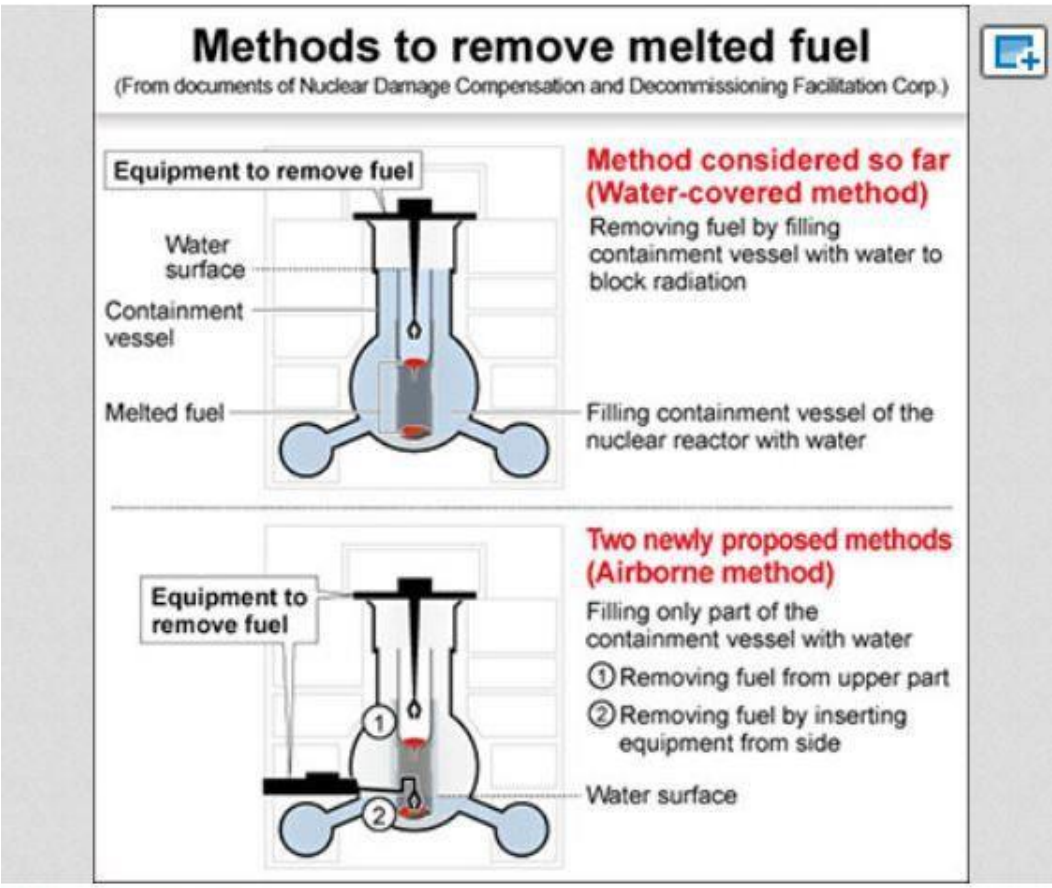
The plant suffered meltdowns at 3 of its reactors as a result of the 2011 earthquake and tsunami.

April 10, 2015

Three possible methods to remove fuel

3 methods proposed to remove melted nuclear fuel at Fukushima plant

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201504100053



The Asahi Shimbun

By HIROMI KUMAI/ Staff Writer

A semi-governmental organization has come up with three possible methods to tackle the most difficult and dangerous task at the stricken Fukushima No. 1 nuclear plant: removing the melted nuclear fuel from the reactors.

All three methods proposed by Nuclear Damage Compensation and Decommissioning Facilitation Corp. (NDF) on April 9 carry the risk of radiation leaks and exposure to workers.

The difficulty in implementing these methods is also compounded by the fact that high radiation levels have prevented workers from determining the precise location and shape of the melted fuel.

The NDF, which is providing technological advice on removing the melted fuel from the No. 1, No. 2 and No. 3 reactors of the Fukushima plant, will incorporate the three methods in a road map scheduled to be revised by the government and the plant's operator, Tokyo Electric Power Co., in spring.

The preferred method, and the only one considered so far, would involve pumping in water to fill the reactor containment vessels to the upper part. The melted nuclear fuel would then be removed from above, and the water would keep radiation exposure of the workers at low levels, according to the plan.

But this "water-covered method" will not work if the containment vessels are corroded or cracked. In addition, if the containment vessels are filled with water, their quake-resistance capabilities would weaken.

"The water-covered method is desirable from the viewpoint of safety," said Hajimu Yamana, the NDF vice president who is in charge of the division supporting decommissioning work. "But it is not certain whether we can completely prevent water leakages from the containment vessels."

For that reason, the NDF also proposed two "airborne methods," under which water would fill only the bottom part of the containment vessels and the melted fuel would be removed through the air.

In one of these airborne methods, the melted fuel would be taken out from the upper part of the containment vessels. In the other method, the fuel would be removed from a hole drilled into the side of the containment vessel.
The big challenge in the two airborne methods is preventing radioactive materials from being scattered in the air and contaminating the workers.
"Respecting the experts' opinions, we want to tackle the revision (of the road map)," said Yosuke Takagi, senior vice minister of economy, trade and industry.
The NDF is also tasked with disposing of radioactive waste and assisting in compensation payments to residents affected by the nuclear accident caused by the March 2011 Great East Japan Earthquake and tsunami.
The NDF explained the three possible methods to residents at a meeting in Koriyama, Fukushima Prefecture.

April 14, 2015

Images from containment vessel

TEPCO footage reveals inside of wrecked Fukushima reactor containment vessel

http://mainichi.jp/english/english/newsselect/news/20150414p2a00m0na004000c.html

An image of objects inside the No. 1 reactor of the Fukushima No. 1 Nuclear Power Plant sent from the robotic probe is seen. The piece in the middle is believed to be a hook for pipe insulation. (Image courtesy of the International Research Institute for Nuclear Decommissioning)

Tokyo Electric Power Co. (TEPCO), the operator of the crippled Fukushima No. 1 nuclear plant, on April 13 released footage taken by a robotic probe sent inside a highly radioactive reactor vessel.
The images sent from the robot that has been sent inside the containment vessel of the No. 1 reactor at the Fukushima No. 1 Nuclear Power Plant included a number of objects scattered on a steel mesh floor

on the ground level. This is the first footage taken inside a reactor containment vessel among those of the No. 1 to 3 reactors at the Fukushima plant that experienced meltdowns in the wake of the 2011 earthquake and tsunami.
The air radiation dosage inside the vessel recorded by the robot was up to around 10 sieverts per hour while temperatures measured at around 17.8-20.2 degrees Celsius. The images showed steam coming from radioactively contaminated water underground.
The utility is set to conduct a study on the basement level of the reactor vessel, to which nuclear fuel is believed to have melted down, by the end of March next year. A TEPCO representative said the company successfully collected data that could lead to the next step of the probe.
TEPCO sent the robot inside the reactor vessel on April 10, but it stopped working after traveling for less than 20 meters. The utility said the robot possibly has got stuck on a bump or some objects on the floor.

Robots essential in decommissioning

Stalled robot still useful in moving Fukushima decommissioning forward, TEPCO says

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201504140034

By HIROMI KUMAI/ Staff Writer
All was not lost when a robotic probe broke down inside a highly radioactive containment vessel at the crippled Fukushima No. 1 nuclear power plant, the plant operator says.
Tokyo Electric Power Co. said the mission showed that robotics has a vital role to play in the decommissioning process.
"It shows that monitoring devices (attached to the robot) can function amid high levels of radiation for two to three days," said a TEPCO official, referring to the tubular-shaped robot that stopped dead in its tracks just hours after entering the first floor of the No. 1 reactor's containment vessel on April 10.
Images taken by the robot, released on April 13 by the plant operator, reveal fist-sized stone-like objects and other debris scattered on the floor. The images also appeared to show a latch and other wreckage, but TEPCO officials said they had no idea where those objects were originally located.
The robot measured radiation levels at six points inside the containment vessel. They ranged from 7.0 to 9.7 sieverts per hour, while temperatures fluctuated between 17.8 and 20.2 degrees.
The sleek, shape-changing robot entered the containment vessel through piping on April 10. But after covering 10 or so meters--about two-thirds of its planned route--the device came to a standstill.
The operation marked the first time to introduce a robotic probe to shoot images in the containment vessels for the No. 1 through No. 3 reactors, where meltdowns occurred after the March 2011 earthquake and tsunami disaster.
The mission was viewed as **essential in paving the way for a full-blown investigation scheduled for the end of this fiscal year.** It is part of preparatory work required to eventually retrieve melted nuclear fuel, the toughest part of the decommissioning process.
While the robot failed to complete its intended mission, the images it took showed there is enough space and no obstacles in an area connecting the first floor and the basement--the planned next probe site--and that pipes on the survey route are more or less intact.
TEPCO gave up trying to retrieve the robot and cut the cable connecting the device to an outside power source on April 13. The plant operator speculated that the robot broke down after it collided with a step or other obstacles.

April 20, 2015

R&D center for decommissioning opens in Tokai

R&D center for dismantling Fukushima No. 1 plant opens

http://www.japantimes.co.jp/news/2015/04/20/national/rd-center-for-dismantling-fukushima-no-1-plant-opens/#.VTX2uZPwmov

Kyodo, JIJI
TOKAI, IBARAKI PREF. – In a ceremony Monday, the Japan Atomic Energy Agency marked the opening of a research center in Ibaraki Prefecture to promote the decommissioning process for the heavily damaged Fukushima No. 1 nuclear power plant.
At the ceremony for the state-funded Collaborative Laboratories for Advanced Decommissioning Science, science minister Hakubun Shimomura described the center's mission.
"We cannot achieve decommissioning without bringing together the world's expertise," he said. "I hope this center will produce research results that will largely contribute to scrapping the Fukushima No. 1 plant," he added.
The event was attended by about 60 officials from the Fukushima Prefectural Government, the U.S. Embassy and other organizations.
The research center was set up on April 1 as part of the JAEA, which is based in the village of Tokai, Ibaraki Prefecture. Its full-fledged research and development facility is expected to be built in fiscal 2016 near Fukushima No. 1, which is operated by Tokyo Electric Power Co.
In the future, the JAEA expects up to around 150 researchers from Japan and abroad to join the institution and plans to carry out personnel training on the decommissioning process.
Decommissioning the Fukushima plant, ruined by a triple meltdown triggered by the massive March 2011 earthquake and tsunami, remains a huge challenge. With all its power gone and its cooling systems unable to function, reactors 1, 2 and 3 suffered core meltdowns that led to hydrogen explosions that gutted the buildings for units 1, 3 and 4.On March 17, Kansai Electric Power Co. said it will decommission reactors Nos. 1 and 2 at its Mihama plant, while Japan Atomic Power Co. said it would decommission the No. 1 reactor at its Tsuruga power station. Both are in Fukui Prefecture.
A day later, Kyushu Electric Power Co.'s board decided to scrap the No. 1 reactor at the Genkai plant in Saga Prefecture, and Chugoku Electric Power Co. decided to decommission the No. 1 reactor at the Shimane plant in Matsue, Shimane Prefecture.
A regulation brought in following the Fukushima disaster forbids nuclear reactors from operating for more than 40 years in principle, but they may be allowed to continue operating for another 20 years if the operators make safety upgrades and the unit passes the regulator's screening.

April 27, 2015

Four to go

Four aging nuclear reactors officially scrapped

http://www3.nhk.or.jp/nhkworld/english/news/20150427_34.html

Four aging nuclear reactors in Japan have been slated for decommissioning under regulations introduced after the Fukushima nuclear accident.

The decision was announced on Monday based on a law that limits a reactors' lifespan to 40 years in principle.

Two of them are at the Mihama plant in Fukui Prefecture, and one is at the Tsuruga plant, also in Fukui. The other one is at the Genkai plant in Saga Prefecture.

A decision to close another reactor in Shimane Prefecture will be made on Thursday.

The operators of the reactors will start drawing up decommissioning plans to be approved by the government's Nuclear Regulation Authority.

With 5 reactors slated for decommissioning, the number of reactors in Japan will fall to 43.

May 5, 2015

More workers getting injured

More workers hurt in Fukushima Daiichi scrapping

http://www3.nhk.or.jp/nhkworld/english/news/20150501_04.html

More people are getting hurt working on decommissioning of the Fukushima Daiichi nuclear plant as the number of inexperienced employees increases.

Tokyo Electric Power Company says 63 people were injured and one died during the year through the end of March. The death resulted from falling off a storage tank.

Six people were heavily injured. 42 people had light injuries. 15 people were hit by heatstroke.

The number of injured was twice that for the previous year. More than 70 percent of them had worked less than a year.

The number of plant workers doubled to about 7,000 a day compared to the figure a year before, due to the increasing construction of water storage tanks.

The utility plans to set up a training facility where people can learn how to work wearing full-face masks as well as several gloves at a time.

Dismantling No.1 cover

TEPCO to remove cover for crippled reactor

http://www3.nhk.or.jp/nhkworld/english/news/20150501_02.html

The operator of the crippled Fukushima Daiichi nuclear plant will begin dismantling the cover of the No.1 reactor building, starting from mid-May.

The cover was installed after the 2011 nuclear accident to prevent radioactive dust from dispersing. Its removal is necessary in order to clear away radioactive debris at the building and finally remove spent nuclear fuel still stored inside.

Preparation for dismantling of the cover began in October of last year. Workers sprayed chemicals over the debris at the upper part of the building in a test for whether dust will stop scattering. They confirmed that the chemicals worked well.

Operator Tokyo Electric Power Company decided to launch full-fledged dismantling work from May 15th. It says it will be a step-by-step, year-long task after spraying the chemicals again.

TEPCO says a preliminary study found radioactive dust at the building will not scatter even during wind of an average 90 kilometers an hour. It says a water spray will contain the scattering should dust be blown by wind.

TEPCO initially planned to start dismantling the cover on the No.1 reactor building in July of last year. But the work sparked fear by local residents that it might scatter radioactive dust. In the previous year, the spread of radioactive dust made people worry when TEPCO removed debris from the No.3 reactor.

May 15, 2015

Dismantling cover of No.1 reactor

TEPCO starts removing cover for Fukushima reactor

http://www3.nhk.or.jp/nhkworld/english/news/20150515_08.html

The operator of the Fukushima Daiichi nuclear plant began work on Friday morning to dismantle the cover of the No.1 reactor building.

The cover was installed after the March 2011 nuclear accident to prevent radioactive dust from dispersing. The reactor experienced a hydrogen explosion at the time of accident.

Tokyo Electric Power Company plans to remove the cover in order to clear away radioactive debris on the upper part of the building and remove spent nuclear fuel still stored inside. It is part of an effort to decommission the reactor.

For about one week, workers will spray chemicals over the debris inside the cover by using a remote-controlled crane to prevent radioactive dust from spreading.

They will proceed with the work to remove the cover over the period of about one year. Company officials say they will enhance monitoring of radiation levels during the procedure.

TEPCO says a preliminary test last year showed no scattering of radioactive materials when dismantling the cover.

The utility initially planned to start dismantling the cover on the No.1 reactor building in July of last year. But the work was delayed after the removal of debris from the No. 3 reactor in 2013 caused radioactive dust to spread, sparking fear among local residents. The death of workers at the plant also affected the plan.

TEPCO starts prep work to take cover off damaged Fukushima reactor

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201505150060

By MASANOBU HIGASHIYAMA/ Staff Writer
Tokyo Electric Power Co. began preparations on May 15 to remove the cover around a damaged reactor building at the crippled Fukushima No. 1 nuclear power plant, the first step in a lengthy process to extracting nuclear fuel inside it.
The work is part of a preparatory process that could take several years for the eventual removal of nuclear fuel from the spent fuel pool in the No. 1 reactor building.
On the first day of the work, TEPCO, the plant operator, sprayed a chemical agent in the reactor building to prevent radioactive dust in the building from being released into the air when the cover is removed.
On May 15, a large crane lifted a spraying machine to insert a thin, long nozzle into the building through holes created on the top cover to spray a glue-like chemical to contain dust and other materials generated by a hydrogen explosion triggered by the March 2011 Great East Japan Earthquake and tsunami.
The agent will be sprayed through the nozzle at 48 points. After it completes the spraying, TEPCO plans to begin retracting the roof cover on May 25 at the earliest to remove debris from the upper part of the building.
When the utility was removing debris from the No. 3 reactor building in the summer of 2013, a large amount of radioactive substances was released into the environment, fostering the public's distrust in the process.
Subsequently, TEPCO has cautiously been proceeding with preparations for removing the cover around the No. 1 reactor building, such as testing anti-scattering agents in advance last October.
Because it is currently rice planting season around the Fukushima plant, TEPCO has pledged to suspend its work and inform surrounding local governments within 30 minutes when amounts of released dust and radiation exceed certain levels.

IAEA stresses importance of communication

IAEA urges better communication at Daiichi plant

http://www3.nhk.or.jp/nhkworld/english/news/20150515_12.html

The International Atomic Energy Agency has stressed the importance of continued dialogue with local residents and other stakeholders over the decommissioning of the Fukushima Daiichi nuclear plant.

The IAEA released on Thursday its final report of the findings of a team of experts. The experts visited Japan in February and again in April to review the decommissioning process.

The report acknowledges good progress in the strategy toward decommissioning the crippled reactors, but it pointed out that the plant's circumstances remain complex and leave many challenges.

The report offers 15 points of advice, including studying the possibility of managing treated radioactive water and releasing the water into the ocean. It also stresses the importance of continuing dialogue with stakeholders and strengthening trust.

Criticism has been mounting about the delayed disclosure of information on a leak of radioactive rainwater into the ocean. The water that accumulated on the roof of the plant's No. 2 reactor building leaked through a drainage channel.

The report says insufficient coordination between Tokyo Electric Power Company's headquarters and its workers at the plant was the likely cause of the delayed disclosure, and urges greater efforts to disseminate information properly.

IAEA: Can do better

IAEA: Handling radioactive waste at Fukushima plant could be improved

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201505150088

REUTERS
VIENNA--The U.N. nuclear watchdog said the management of radioactive waste and contaminated water at Japan's tsunami-crippled Fukushima nuclear power plant could be improved despite good progress in cleaning up the site.
The operator of the plant said in February it had found a pool of highly contaminated water on the roof of a plant building and that it had probably leaked into the sea through a gutter when it rained.
A massive earthquake and tsunami four years ago caused meltdowns at Tokyo Electric Power Co Inc's (TEPCO) Fukushima reactors.
Some of the leaks have been dealt with to avoid a repetition of such incidents, the International Atomic Energy Agency (IAEA) said. Measures have included filling and covering of gaps, recovery of contaminated soil and treating surfaces to prevent rainwater leakages.
"While acknowledging these efforts, the IAEA experts encourage TEPCO to continue to focus on finding any other sources contaminating the channels," the agency said in a statement on May 12.
The creation in 2014 of a new branch of TEPCO, called Fukushima Daiichi Decontamination and Decommissioning Engineering Company (FDEC), was a good step to define clear responsibility for the clear-up, the IAEA said.
Still, there is room for improvement in how the body handles radioactive waste, for example by more complete waste characterization and packaging, the U.N. watchdog added.
"FDEC could better employ long-term radioactive waste management principles (beyond the segregation, relocation and dose reduction/shielding currently performed)," the agency said.
"While recognizing the usefulness of the large number of water treatment systems deployed by TEPCO for decontaminating and thereby ensuring highly radioactive water ... is not inappropriately released..., the IAEA team also notes that currently not all of these systems are operating to their full design capacity and performance."
The IAEA will send a team to Japan this month to collect water samples from the sea near the Fukushima plant to help Japanese authorities with radioactive data collection and analysis.
In a 240-page report released to the agency's member states on May 14, IAEA chief Yukiya Amano said Japan had not been sufficiently prepared for the 2011 accident, which triggered action to improve safety at nuclear plants across the globe.

"Responsibilities were divided among a number of bodies and it was not always clear where authority lay," Amano said of Japan. "There were also certain weaknesses in plant design, in emergency preparedness and response arrangements and in planning for the management of a severe accident."

May 26, 2015

Nuclear Watch: Know-how from overseas

Know-how from Overseas

http://www3.nhk.or.jp/nhkworld/english/news/nuclearwatch/20150526.html

A group of experts from Japan has been on a mission overseas. They went in search of technologies to help advance the decommissioning process at the crippled nuclear plant in Fukushima.
The group's members are from the Nuclear Damage Compensation and Decommissioning Facilitation Corporation. Experts estimate it will take 40 years to decommission the plant's reactors. They say relying on Japanese technologies alone won't be enough to get the job done.
Mamoru Numata is from the organization. He says, "We need to look meticulously into technologies not only from Japan but from abroad as well."
The inspectors traveled to the US state of South Carolina to meet with researchers at the Savannah River National Laboratory. The lab was a hub for nuclear weapons development during the Cold War. It produced plutonium for nuclear bombs.
Cleaning up leftover radioactive substances is an ongoing job. The lab continues to come up with new technologies to make the job go smoothly. One in particular caught the eye of the Japanese inspectors. It's a system designed to provide a virtual tour of a building's interior.
A researcher at the facility says, "We can plan it here in the virtual world, practice in the virtual world. We can put robotics in the virtual world or virtual robots."
The system uses information on the layout and the positioning of equipment to generate 3-dimensional images. Those images can be combined with radiation data collected remotely by robot. This allows workers to determine how much radiation they could be exposed to inside.
The inspectors also went to a trade show in Arizona featuring decommissioning technologies from around the world. The show featured one type of technology that could be used immediately in Fukushima.
It's a foam made from a mixture of chemicals, including a detergent. Scientists from an American company and a national research institute developed it.
The inspectors thought the foam could be used in pipes at the Fukushima Daiichi plant. They're full of radioactive substances. Cleaning the pipes is one of the biggest challenges in the decontamination effort.
The inspectors say that injecting the foam into the pipes could loosen up contaminated substances and make cleaning them easier.
The foam has already been used in decontamination projects. The manufacturer says it successfully removed at least 90 percent of the radioactivity.
Numata says, "I hope we can gather decontamination technologies from around the world and apply them in Fukushima."
The people in charge of decommissioning the Fukushima Daiichi plant face a number of hurdles. The biggest is the dangerous job of removing melted nuclear fuel from the damaged reactors.
The inspectors will keep searching for cutting-edge technologies from Japan, and overseas, to meet the challenges.

May 27, 2015

Ceramic blocks to store radioactive water?

Potter creates ceramic cure to help stop radioactive water leaks at Fukushima

http://ajw.asahi.com/article/behind_news/social_affairs/AJ201505270060

By KEIZO FUKATSU/ Staff Writer
YOKKAICHI, Mie Prefecture--A manufacturer of traditional ceramics has created special blocks that can absorb water, a development that could enable radioactive water at the Fukushima No. 1 nuclear power plant to be stored safely.
“Contaminated water would not leak if it is stored inside the blocks,” said Taiji Mizutani, who heads Mizutani Shoten. “We will commercialize the product after verification experiments and hope evacuees from Fukushima will be able to return to their homes as early as possible.”
Mizutani came up with the idea of developing water-absorbing blocks with unglazed ceramics when he was working as a volunteer in the Tohoku region, which was devastated by the March 2011 Great East Japan Earthquake and tsunami.
The 37-year-old expressed concern about frequent reports of highly radioactive water leaking from storage tanks at the stricken plant.
Since the disaster, Mizutani has visited affected areas more than 10 times and interacted with people who were evacuated from their homes near the nuclear plant.
“I always wanted to help them return to their hometowns,” Mizutani said.
He first realized ceramics may be useful for storing radioactive water when he found biscuit ware absorbs glaze more easily. Then, Mizutani began testing the water-absorbing quality of ceramics.
He mixed chaffs of grain with soil mainly comprised of clay. Because rice hulls burn away when the soil is fired, hollows remain where the chaffs existed. Mizutani also kept the firing temperature at around 700 degrees to remove water from the clay and create tiny linear cracks.
According to Mizutani, the hollows and cracks help the ware absorb water. It took Mizutani almost a year to develop the highly absorbent material.
While ordinary unglazed ceramic ware absorbs 40 percent of its weight in water, Mizutani's “spongelike” block absorbed a volume equivalent to its own weight in just two minutes in one experiment, Mizutani said.
He has received patents for the special block as well as his original water-storage system, in which contaminated water is stored after being absorbed by the ceramic blocks laid on a huge pool made of high-density concrete.
He intends to reach out to Tokyo Electric Power Co., the operator of the Fukushima plant, so the product can be used in the decommissioning process at the crippled facility.

June 4, 2015

Two more temporary stockyards in Fukushima

2 Fukushima waste storage sites to be built

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's environment ministry will soon start building two more temporary stockyards to store radioactive waste from decontamination work in Fukushima Prefecture. A nuclear accident took place

there in 2011.

The stockyards are facilities to temporarily store contaminated soil and other waste before it goes to a main storage facility that has yet to be built.

The ministry already has two such stockyards in the region of Futaba and Okuma towns. The two towns host the damaged nuclear plant. The stockyards can store 20,000 cubic meters of waste.

With the two new stockyards to be built in the same region, the ministry has now nearly secured enough land to carry out its plan to transfer **more than 40,000 cubic meters of waste** gathered from 43 municipalities in the prefecture in a year.

Work to transfer radioactive waste to the existing stockyards began in March. But the ministry has only transferred 3,000 cubic meters of waste. That's less than a tenth of the planned annual total amount.

As for the entire site of the main storage facility planned for the same area, the Environment Ministry faces the challenge of negotiating with more than 2,300 landowners. Only a few have so far agreed to sell their land.

The planned main storage facility is for intermediate storage until a site is secured for final disposal. Legislation obliges the government to ensure the waste stored in the main storage facility is moved to a final disposal site outside Fukushima Prefecture within 30 years.

June 6, 2015

Robots challenge in California

Disaster-response robots compete in California

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Robots from around the world are competing for a 2-million dollar first-prize in the US state of California. Engineers have entered devices designed to respond to natural and man-made disasters.

The 2-day DARPA Robotics Challenge started on Friday.

The competition was launched by a US Defense Department research institute. It aims to help develop robots capable of assisting humans in rescue and restoration operations.

Members of the institute say the Fukushima nuclear accident in Japan in 2011 was one inspiration.

Twenty-three teams are participating in the event.

Four teams are from Japan. Among them are the University of Tokyo, and the National Institute of Advanced Industrial Science and Technology.

At a simulated disaster site, the entrants remotely controlled their humanoid robots in a bid to overcome 8 tasks such as crossing a debris field, driving a vehicle and opening a door.

The teams compete in how many tasks they can complete and the total points earned.

A large crowd has gathered to watch the robots in battle. Spectators cheer whenever a machine clears a challenge.

Robots compete in Fukushima-inspired U.S. challenge

http://www.japantimes.co.jp/news/2015/06/06/business/tech/robots-compete-in-fukushima-inspired-u-s-challenge/#.VXLURUbwmos

AFP-JIJI
POMONA, CALIFORNIA – Robots from six countries, including the United States, Japan and South Korea, went diode-to-diode Friday in a disaster-response challenge inspired by the 2011 Fukushima nuclear meltdown.
The winner of the DARPA Robotics Challenge (DRC), to be announced Saturday after a two-day competition in California, will take home $2 million. The runner-up will get $1 million, and $500,000 will go to the team in third place.
They will also win kudos for triumphing after a three-year robotics contest organized by the Defense Advanced Research Projects Agency (DARPA), which commissions advanced research for the U.S. Defense Department.
“The U.S. military has an implicit mission to respond to humanitarian disaster relief. But in order to do so, you need the tools to effectively respond,” said DARPA official Brad Tousley. “In many cases, you’d like to send robots into the places that it’s very dangerous for humans to go into,” he said, citing nuclear reactor disasters and also earthquakes and epidemics like Ebola
In all, 24 mostly human-shaped bots and their teams — 12 from the United States, five from Japan, three from South Korea, two from Germany and one each from Italy and Hong Kong — won through to the finals.
Over the two days, each robot has two chances to compete on an obstacle course comprising eight tasks, including driving, opening a door, opening a valve, punching through a wall and dealing with rubble and stairs.
The challenges facing them in Pomona, just east of Los Angeles, were designed specifically with Fukushima in mind.

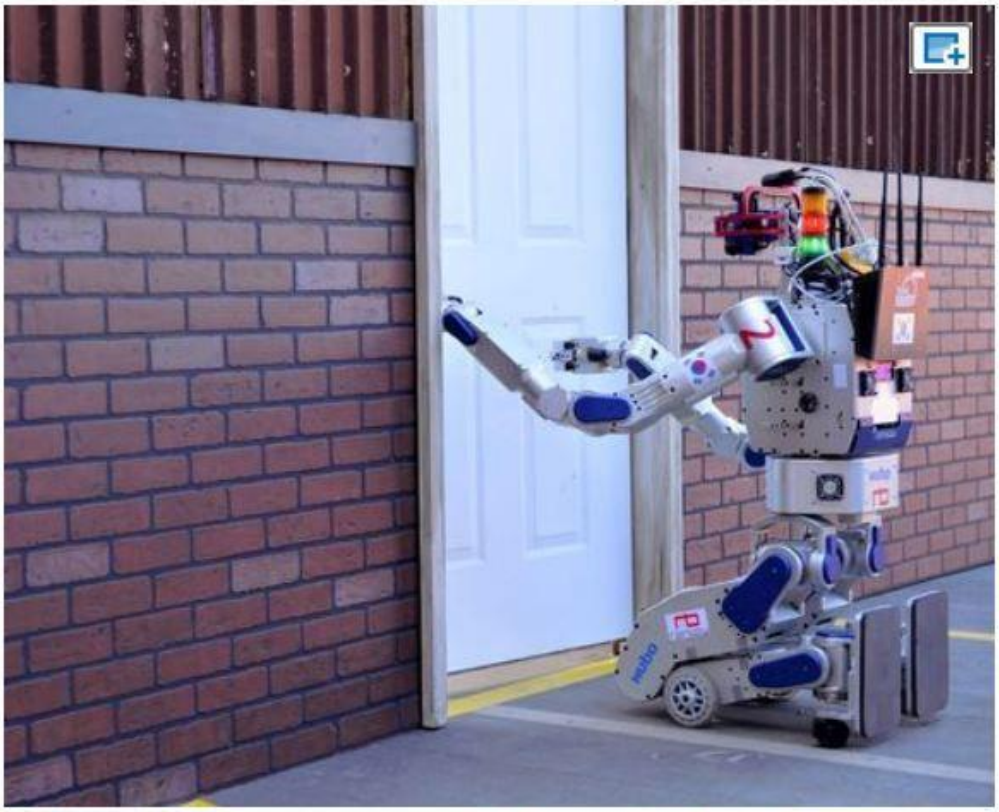
After the March 11, 2011, mega-quake and tsunami, a team of plant workers set out to enter the darkened reactor buildings and manually vent accumulated hydrogen. They had to turn back due to radiation — and in the days that followed, hydrogen built up, fueling explosions that extensively damaged the facility, contaminating the environment and drastically worsening the crisis.
"If the Japanese had had advanced robotics systems that could have used tools that we use in everyday life … they might have prevented some of the damage from the subsequent hydrogen explosions," said Tousley.
While the robotics teams competing in Pomona are focused on the tasks in hand, they also have their eyes on more than just winning the competition.
"Hong Kong is a financial center. … We hope we can inspire the people with more innovation, to be interested in engineering and technology," said Robert Hung from Hong Kong University.
Maurice Fallon of the Massachusetts Institute of Technology said that while robots could become crucial in disaster responses, "the applications outside of this domain are very wide. Eventually we hope that the technology that is being demonstrated here will be used in our daily lives, from home help to elderly care to agriculture and construction — there are many applications."
But watching the competition in Pomona, it must be said that the technology can appear less than impressive. It takes most robots five minutes to open a door, while many of them give up on the task of getting out of a car.
JAXON, the robot from Team NEDO-JSK of the University of Tokyo, is not the only bot to take a tumble, in its case after failing to properly grasp a valve wheel. It had to be carried away on a stretcher.
They are not exactly Transformers yet.
"There is a long way to go," admitted Tousley. "There's fact and there's fiction. There's a lot of fiction out there that robots are much more capable than they really are.
"But part of DARPA's job is to show the possible, and what we can start to do. And then, often, other organizations and other countries or other companies will invest more to bring it along. But it's our job to start that process."

June 8, 2015

South Korea wins robot challenge

South Korean team wins $2 million prize in disaster-response robot test

http://ajw.asahi.com/article/behind_news/social_affairs/AJ201506080009



The South Korean team robot wins the DARPA Robotics Challenge Finals on June 6 in Pomona, Calif. (Provided by DARPA)

THE ASSOCIATED PRESS

POMONA, Calif.--The robots drove, walked through rubble, climbed stairs, turned valves and sometimes fell, amid cheers and groans from a crowd of thousands at the Fairplex here.

After three years of research, development and an obstacle course of competition, a South Korean team on June 6 won the three-year, $3.5 million U.S. contest to create a robot capable of responding to disaster conditions that are unsafe for humans.

Team Kaist of Daejeon took home $2 million in first-place prize money for its DRC-Hubo robot, which successfully completed eight tasks related to disaster response in less than 45 minutes at the DARPA Robotics Challenge Finals.

The contest by the U.S. Defense Advanced Research Projects Agency (DARPA) started after the 2011 Fukushima No. 1 nuclear power plant disaster in Japan. Workers couldn't vent hydrogen from the overloaded reactors without enduring excess radiation. The idea was to create a robot that could do such important emergency tasks in the future and get to the problem site.

Competition was fierce among 23 international teams, including a dozen from the United States and 11 from Japan, Germany, Italy, South Korea and Hong Kong. The robots were timed while navigating eight tasks they would likely encounter in emergency scenarios. The challenge required the teams have their robots face increasingly difficult competitions over two years.

Team IHMC Robotics of Pensacola, Fla., finished second, winning $1 million for its robot Running Man. Tartan Rescue of Pittsburgh, Pa., and its robot CHIMP, designed by Carnegie Mellon University's National Robotics Engineering Center, came in third, winning $500,000.

The event was live-streamed, and YouTube videos culling together clips of the robots taking falls throughout the competition were tweeted out.

"These robots are big and made of lots of metal, and you might assume people seeing them would be filled with fear and anxiety," said Gill Pratt, DARPA program manager and the competition organizer in a statement. "But we heard groans of sympathy when those robots fell. And what did people do every

time a robot scored a point? They cheered! It's an extraordinary thing, and I think this is one of the biggest lessons, the potential for robots not only to perform technical tasks for us, but to help connect people to one another."

June 10, 2015

Removal of spent fuel pushed back

Start of reactor fuel removal at crippled Fukushima No. 1 plant may be delayed up to three years

http://www.japantimes.co.jp/news/2015/06/10/national/start-reactor-fuel-removal-stricken-fukushima-1-may-delayed-three-years/#.VXgtZkbwlLN

Kyodo
The government and Tokyo Electric Power Co. are planning to push back the start of removing spent fuel at the wrecked Fukushima No. 1 nuclear complex by two to three years from the current schedule, according to government sources.
Under an envisioned revised road map for decommissioning reactors 1 to 4 at the plant, which was ravaged by the March 2011 earthquake and tsunami, work to begin removing the spent fuel from the No. 3 pool is expected to be delayed until fiscal 2017, the sources said Tuesday. Originally that work was to begin in the first half of fiscal 2015.
Removal work on the Nos. 1 and 2 pools, which was supposed to begin in fiscal 2017, is now expected to start in fiscal 2020.
There is no change to the overall timeline for decommissioning the plant within 30 to 40 years after the nuclear calamity, according to the sources.
The government is expected to hold a Cabinet meeting as early as Friday to officially reflect the changes in the road map.
The government and Tepco, the plant operator are moving to revise the road map for the first time since June 2013. They apparently believe the existing plan has placed too much priority on speeding up decommissioning efforts and put a heavy burden on workers at the complex.

June 11, 2015

Special drone for Fukushima reactors

Drone being developed to fly autonomously inside Fukushima reactor buildings

http://www.japantimes.co.jp/news/2015/06/11/national/science-health/drone-developed-fly-autonomously-inside-fukushima-reactor-buildings/#.VX3PAkbwmot

JIJI
CHIBA – A drone is being developed to survey the interior of reactor buildings at Tokyo Electric Power Co.'s Fukushima No. 1 plant.
The unmanned aircraft will use lasers to detect and avoid obstacles in flight and will be able to land to replace its batteries in the absence of an operator.

A test flight was completed at the plant's No. 5 reactor building, which escaped severe damage in the March 2011 nuclear disaster.
It is not known when the meter-wide hexacopter will be ready to begin inspections inside the buildings housing the No. 1 to No. 3 reactors, which suffered meltdowns, but the team behind it is confident the drone will have a role to play.
"The time will certainly come when drone technology will be of help," said a member of the development team.
The drone is the work of Autonomous Control Systems Laboratory Ltd., a university-based venture headed by Kenzo Nonami, a professor at Chiba University.
The six-propeller drone is equipped with a camera, an instrument to measure radiation levels, and a dust collector.
The aircraft is different from conventional drones in that it can detect walls and other obstacles by laser, even when inside a reactor building, where GPS would not work and where radiation doses may be too high for humans.
The information gathered during a survey flight is converted into three-dimensional data in real time, enabling the production of images of damaged walls and dangling piping, for instance.
The lab has also developed an instrument for automatic battery replacement to eliminate the risk of plant workers being exposed to radiation during battery changes.
When the power begins to run low, the drone automatically lands on a "heliport" on the flatbed of a truck and loads itself with a new battery. This will enable it to prolong its mission.
In the demonstration test at the plant's No. 5 reactor building, the drone was used to carry out an inspection from the first floor to the fifth floor, where a pool for spent fuel is located. The test proved the aircraft's ability to shoot video and measure radiation levels.
Nonami started developing the drone soon after the March 2011 nuclear crisis began, anticipating that there would be demand for a flying robot in what is shaping up to be a decades-long cleanup.
"Once the work shifts to the stage of removing melted nuclear fuel from damaged reactors, radiation doses are expected to rise in the work areas," Nonami said.
"I think the drone will be useful as it can be sent to measure radiation levels and contribute to giving the highest priority to human safety."

June 12, 2015

Two ways of presenting the same thing

Removal of spent nuclear fuel at Fukushima plant to be delayed

http://mainichi.jp/english/english/newsselect/news/20150612p2g00m0dm033000c.html

TOKYO (Kyodo) -- The government and Tokyo Electric Power Co. decided Friday to push back the start of used nuclear fuel removal from cooling pools at the crippled Fukushima Daiichi complex by a few years from the current schedule, with the decommissioning work proving to be highly difficult more than four years after the 2011 crisis.
Taking out fuel rod assemblies from the spent fuel pools inside reactor buildings is one of the key steps before extracting fuel debris from the Nos. 1 to 3 reactors that suffered core meltdowns. Despite the delay, the overall timeline for finishing the cleanup process of around 30 to 40 years remains intact, the government and TEPCO said.

According to the revised road map for decommissioning, removal work for the fuel assemblies from the No. 3 unit's cooling pool -- which is located above the damaged reactor -- will be delayed until fiscal 2017 from the first half of fiscal 2015.
Work to take out fuel assemblies from the Nos. 1 and 2 units' pools is now expected to begin in fiscal 2020, pushed back from the originally planned fiscal 2017.
Subsequent extraction of fuel debris -- the most challenging part of the decommissioning process -- is expected to start in 2021, but the government and the plant operator have yet to decide on detailed methods. They are seeking to decide on how to remove the fuel debris in fiscal 2018.
The latest road map also sets the goal of cutting the amount of underground water -- which is seeping into the plant and mixing with radioactive water generated in the process of cooling the damaged reactors -- to less than 100 tons per day in fiscal 2016 from the current 300 tons to address the toxic water buildup at the site.
It also said the government and TEPCO will begin discussions in the first half of 2016 on how to dispose of processed water that contains radioactive tritium -- currently deemed difficult to be removed due to the lack of practical technology.
The International Atomic Energy Agency and Japan's Nuclear Regulation Authority have suggested that such water be released into the ocean, rather than be kept in tanks, to enhance the safety of the plant, but TEPCO remains undecided on the issue given strong local opposition to dumping the water.
The government and TEPCO revised their road map for decommissioning the plant for the first time in two years, as the previous plan placed too much priority on speeding up decommissioning efforts, putting a heavy burden on workers exposed to the highly radioactive environment at the complex.
The road map was first crafted in December 2011 in the wake of a huge earthquake and tsunami in March of that year which triggered the world's worst nuclear crisis at the Fukushima plant since the 1986 Chernobyl disaster.
The major progress made so far in the unprecedented decommissioning process has been the removal of all fuel assemblies from a cooling pool of the No. 4 reactor. The No. 4 unit suffered a hydrogen explosion but avoided a reactor meltdown, unlike the Nos. 1 to 3 reactors.

Fuel removal delayed by up to 3 more years

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

A new roadmap says the removal of fuel rods from the spent fuel pools of the crippled reactors at the Fukushima Daiichi plant will begin 2 to 3 years later than originally planned.

Officials from the Japanese government and Tokyo Electric Power Company officially endorsed the revised plan at a meeting on Friday.

The decommissioning schedule for the reactors disabled in the 2011 earthquake and tsunami was reviewed for the first time in 2 years.

The roadmap refers to 2 major tasks -- removal of the fuel rods left inside spent fuel pools in the reactor buildings and cleaning up the melted nuclear fuel in the reactors.

The revised plan says the removal of fuel rods from the pools may be postponed until 2017 at the No.3 reactor building -- a delay of 2 years. It says the work at the No.1 and No.2 reactor buildings will start in 2020 -- 3 years later than originally planned.

Officials cite the need for more time to remove radioactive debris from the buildings and decontaminate the facility.

The revised roadmap also calls for studying new ways of removing molten fuel from the reactors, in addition to the current procedures. The new methods will not utilize water to shield workers from the strong radiation.

The initial methods entailed filling the reactor containment vessels with water before removing the melted fuel.

But the officials found this to be more difficult than they originally thought due to the possibility of water leaks from the vessels as well as the need to ensure their earthquake resistance.

The new roadmap keeps the initial target of beginning the removal of melted nuclear fuel within 6 years, but the plan does not state which reactor will be chosen first.

Industry ministry officials say the start of the removal will depend on which method is selected, but they believe it can begin within 6 years.

Roadmap keeps initial plan to remove melted fuel

http://www3.nhk.or.jp/nhkworld/english/news/20150612_13.html

The new roadmap for scrapping the crippled Fukushima Daiichi nuclear plant maintains the initial target of starting the most difficult work -- the removal of melted nuclear fuel from its reactors -- within 6 years.

But the plan still does not set a schedule for such things as which reactor will come first and when.

Officials from the Japanese government and Tokyo Electric Power Company officially endorsed the revised plan at a meeting on Friday.

The decommissioning plan for the reactors disabled in the 2011 earthquake and tsunami was revised for the first time in 2 years.

The plan now calls for studying new methods to remove the molten fuel in addition to the current methods. The new methods will not utilize water to shield workers from the strong radiation.

The initial methods entailed filling the reactor containment vessels with water before removing the melted fuel. But they found this to be more difficult than originally thought due to the possibility of water leaks from the vessels as well as the need to ensure their earthquake resistance.

In the roadmap, officials maintained the previous goal of starting to remove the melted fuel by 2021.

The roadmap also refers to plans to remove less damaged fuel rods from the plant's spent fuel pools. It says this work may be delayed by up to 3 years from the previous plan, citing the need to first remove debris from the buildings and decontaminate the facility.

Referring to the melted nuclear fuel, industry ministry officials say the start of the removal will depend on which method is chosen. Officials added that they believe this can be started within 6 years.

Decommissioning: Revision of road map

Japan delays nuclear fuel removal schedule for Fukushima plant

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201506120098

WIRE REPORTS

The government approved on June 12 a revised 30- to 40-year road map to clean up the wrecked Fukushima No. 1 nuclear plant, but many questions remain.

The plan, endorsed by Cabinet members and officials, delays the start of a key initial step--the removal of spent fuel in storage pools at each of the three melted reactors--by up to three years due to earlier mishaps and safety problems at the plant.

This marks the second revision of the road map after it was last revised in June 2013. The government did not make changes to the overall goal to complete the decommissioning work in 30 to 40 years.

Three of the plant's six reactors melted following the 2011 earthquake and tsunami. The fourth, which was offline and had no fuel in the core at the time of the accident, suffered damage to its building, and its fuel storage pool was emptied late last year.

The plant operator, Tokyo Electric Power Co., has successfully removed 400 tons of spent fuel located in the upper floor of the No. 4 reactor building in a year long operation

Despite the delay, experts need to locate and study melted fuel inside the reactors and develop robots to start debris removal within six years as planned.

Experts believe melted fuel had breached the reactor cores and mostly fell to the bottom of the containment chambers, some possibly sinking into the concrete foundation.

TEPCO has conducted limited surveys of the reactors using remote-controlled robots.

The road map says the initial plan to repair damage in the containment chambers and fill them with water to conduct debris removal underwater is more technically challenging than previously thought, and alternative plans need to be studied.

Radiation levels at the reactors remain high and the plant is still hobbled by the massive amount of contaminated water.

The government also said on June 12 that it plans to revoke evacuation orders for most people forced from their homes by the Fukushima nuclear disaster within two years as part of a plan to cut compensation payouts and speed up reconstruction.

Thousands of Fukushima residents remain in temporary housing more than four years after the Great East Japan Earthquake and tsunami triggered meltdowns, explosions and radiation leaks at the Fukushima No. 1 plant.

Some areas have been opened, but many people are reluctant to return because of a lack of facilities and distrust of government claims it is safe. Others are resigned to never returning to their homes and businesses.

"My hometown is Futaba and I returned from Tokyo dreaming of reviving an industry" before Fukushima, said Takahisa Ogawa, 44, a beekeeper before the meltdowns.

"All that came to nothing because of the nuclear disaster," he said during a trial seeking compensation.

Futaba town is close to the plant and will not have its evacuation order lifted under the plan.

Prime Minister Shinzo Abe's government and the utility, bailed out by taxpayers in 2012, are undertaking an unprecedented cleanup to lower radiation levels in towns closest to the plant, although some areas will likely remain off limits for decades.

* * *

Main points of the revised road map

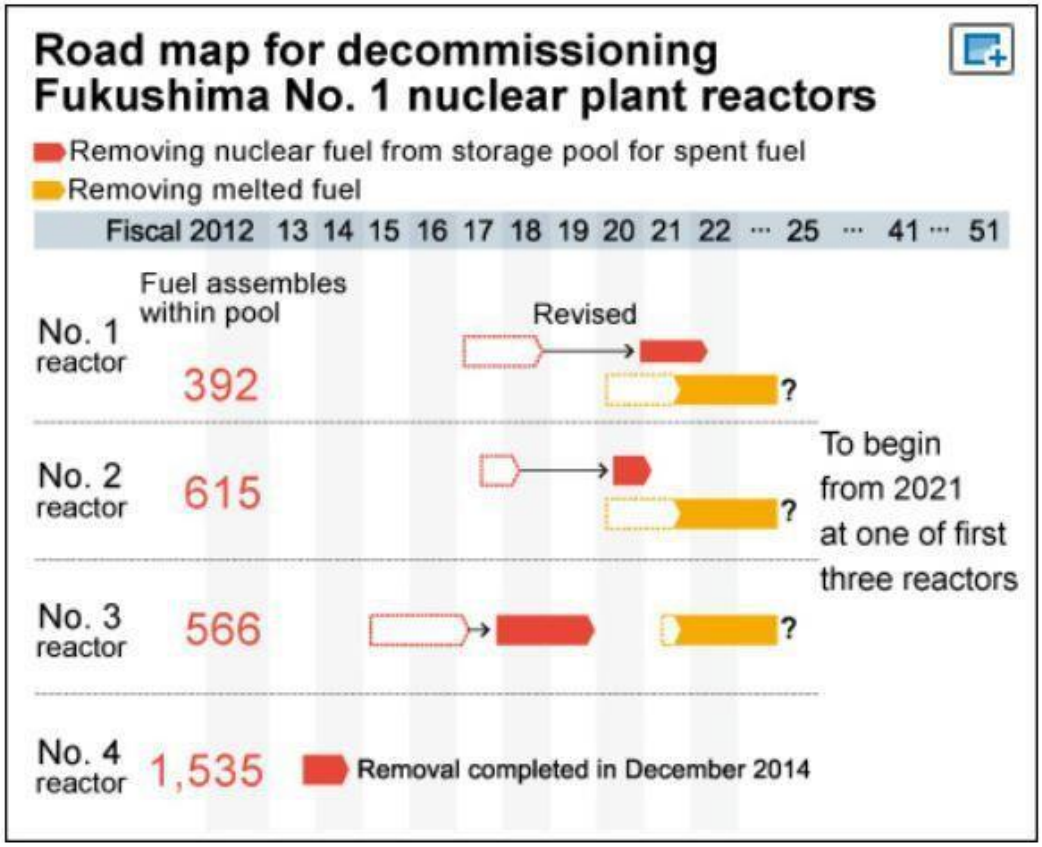
- Completing measures against contaminated water by 2020. This will reduce the presence of contaminated water inside the reactors as well as the increase in contaminated water that is hampering the decommissioning work to almost zero.

- Reducing the overflow of water to the reactor buildings from the surrounding to below 100 cubic meters per day by March 2017. (new target)
- Halving the volume of radioactive materials in contaminated water inside the reactor buildings by March 2019. (new target)
- To decide a policy for removing melted nuclear debris from the three reactors in two years' time.
- Setting a method for removing melted debris from the No. 1 reactor in April-September 2018.
- Starting work to remove nuclear debris from the No. 1 reactor in 2021, delayed from its previous goal of 2020.
- Following is the new schedule for the start of work to remove spent nuclear fuel in cooling pools.
No.1 reactor: April 2020-March 2021
No.2 reactor: April 2020-March 2021
No.3 reactor: April 2017-March 2018

June 13, 2015

Decommissioning: Not so obvious

INSIGHT: Success of revised decommissioning plan for Fukushima far from a done deal



The Asahi Shimbun

Safety over speed reflects the thinking behind the revised road map for decommissioning the reactors at the Fukushima No. 1 nuclear power plant.

Officials of the central government and plant operator Tokyo Electric Power Co. had wanted in the past to move quickly in decommissioning the reactors in part because that would also speed up the rebuilding process in Fukushima Prefecture.
However, because of the unprecedented scale and nature of the decommissioning project resulting from the triple meltdown triggered by the 2011 earthquake and tsunami disaster, the rush to move on resulted in only more problems that had to be addressed.
The revised road map that got the official go-ahead June 12 delays the removal of nuclear fuel from the three reactors by as much as three years. The new schedule was needed because of the numerous problems that arose in the preliminary stages of work to prepare for the most difficult work of removing nuclear fuel assemblies from the spent fuel storage pools. An even more dangerous process that comes with its own larger set of unknown factors is removing the melted fuel in the reactor cores of the No. 1, No. 2 and No. 3 reactors.
One of the biggest problems has been removing debris at the plant site caused by the explosions at the reactors, along with decontaminating work areas with high levels of radiation, stopping leaks of radiation-contaminated water and dealing with radioactive materials that are still gushing.
The hurried pace of past work may have been a factor behind a spike in work-related accidents at the plant site.
New targets have been established for dealing with the continuing problem of contaminated water.
One goal is to reduce the flow of groundwater into the reactor buildings by the end of fiscal 2016 to less than 100 tons a day from the current daily level of about 300 tons.
However, achieving that goal will require successful operation of two separate projects. One is the construction of an underground frozen wall of soil to divert groundwater, while the other involves processing pumped up groundwater before releasing it into the ocean.
Even if the contaminated water problem is dealt with, there are other issues that have to be addressed before removal of the nuclear fuel from the reactors can begin.
The overall goal of completing the decommissioning within a period of 30 to 40 years has not changed.
The road map also maintains the objective of starting the removal of melted fuel at one of the three reactors in 2021. To achieve that goal, the method for removing that fuel will have to be finalized in early fiscal 2018.
However, a major problem is the uncertainty about just where that melted fuel is located within the reactor containment vessel.
Remote-controlled robots will be used within the vessels to assess conditions there.
Hajimu Yamana, deputy head of the Nuclear Damage Compensation and Decommissioning Facilitation Corp. who is in charge of providing technological advice, said, "By using investigative robots to gather information, we will have a pretty good idea of the state of the melted fuel within two years. We should have all the information we would need by then in deciding how to remove the fuel."
But some experts still seem to think the authorities are rushing things.
Shigeaki Tsunoyama, former president of the University of Aizu in Fukushima Prefecture who serves as an adviser to the Fukushima prefectural government on nuclear issues, cast doubt on whether fuel removal could begin within three years of deciding the removal method.
He cited the problem of developing specialized equipment, training the workers to use it and screening by the Nuclear Regulation Authority as being time-consuming issues that would have a bearing on the outcome.
(This article was written by Hiromi Kumai and Koji Kitabayashi.)

June 15, 2015

Decommissioning needs full gov't support

Editorial: New technology to help resolve Fukushima nuclear crisis needs gov't backing

http://mainichi.jp/english/english/perspectives/news/20150615p2a00m0na007000c.html

The Japanese government has once again revised the work schedule for decommissioning reactors at the triple-meltdown-stricken Fukushima No. 1 nuclear plant. The last major change was in June 2013, and this one pushes back the removal of spent fuel rods from the fuel pools of the No. 1-3 reactors by as much as three years. The delay is due to unexpected difficulties preventing the escape of airborne radioactive contaminants during decontamination and wreckage clearing work.

Decommissioning reactors at the heart of one of the world's worst nuclear disasters is of course bound to be extremely difficult, and this reality is coming into sharp relief.

Progress on dismantling the Fukushima reactors has a direct bearing on both overall regional disaster recovery and when local residents will be able to finally return home. As such, we call on both the government and plant operator Tokyo Electric Power Co. to develop a reactor decommissioning strategy with a solid strategic foundation, and to thoroughly release information on the process.

The latest revisions to the decommissioning work schedule were based on the basic principle of putting the safety of locals and plant workers first. The first version of the work schedule was obsessed with speed. The result was a rash of worker injuries and deaths and other problems that ended up causing progress to be delayed. Rather than making speed top priority, it's more important to carefully and surely reduce the various risks related to the Fukushima plant.

The jobs with the highest priority under the work plan's latest iteration are the recovery of nuclear fuel rods from the fuel pools, and dealing with the vast quantities of radioactively contaminated water produced at the plant. Though these tasks are certainly important, the most difficult hurdle in the decommissioning process will be extracting the melted fuel from inside the stricken reactor vessels. Under the new schedule, this is set to start on just one of the reactors sometime in the year 2021. That's some six years away, but the path from here to there remains foggy at best. First of all, no one knows for sure exactly what state the fuel is in or even where it is in the reactor housings.

The method for getting the fuel out is also up in the air. At first, planners thought it best to fill the reactor vessels with water to suppress the intense radiation when the operation began. This fell by the wayside, however, when it turned out to be difficult to identify damaged spots on the reactor vessels and stop water from escaping. Now, an in-air removal method is being considered, though entirely new equipment will need to be developed to perform the operation in the highly radioactive environment while at the same time preventing contaminants from getting airborne.

There are a number of research institutes and universities across Japan that are receiving government support to invent the technology needed for this reactor decommissioning work. The "control tower" for these efforts is the Nuclear Damage Compensation and Decommissioning Facilitation Corp. (NDF), created by the government in August last year. The corporation is tasked with overseeing each project from basic research through to practical application, and to optimize the development process.

The NDF, however, has just 35 or so technical staff. It's an open question whether the NDF can exercise effective oversight for such a wide program with so few people. The government is trying to enhance the corporation's functions, but there have been no concrete measures forthcoming so far. At this rate, might the 30-40 year target to decommission the Fukushima reactors come under serious pressure?

Prime Minister Shinzo Abe has said more than once that "the national government stands on the front lines" of the efforts to deal with the decommissioning work. Then more than ever, the government must create a system to provide full and complete support for the technology research and development projects needed to finally bring the nuclear crisis to an end.

July 16, 2015

Follow the Money (Arnie Gundersen)

Fukushima Daiichi Decommissioning: Follow The Money

http://www.fairewinds.org/nuclear-energy-education/fukushima-daiichi-decommissioning-follow-the-money

Are the meltdowns at Fukushima Daiichi over? The answer is no. In Fairewinds' latest video, Chief Engineer and nuclear expert Arnie Gundersen updates viewers on what's going on at the Japanese nuclear meltdown site, Fukushima Daiichi. As the Japanese government and utility owner Tokyo Electric Power Company push for the quick decommissioning and dismantling of this man-made disaster, the press and scientists need to ask, "Why is the Ukrainian government waiting at least 100 years to attempt to decommission Chernobyl, while the Japanese Government and TEPCO claim that Fukushima Daiichi will be decommissioned and dismantled during the next 30 years?"
Like so many big government + big business controversies, the answer has nothing to do with science, and everything to do with politics and money. To understand Fukushima Daiichi, you need to *follow the money*.
Listen

English Transcript:

Hi, I'm Arnie Gundersen with Fairewinds Energy Education. Every week we get emails and phone calls asking us questions like:
· Are the meltdowns at Fukushima Daiichi over?
· Have the problems been solved?
· Should we still be worried?
The answers are no, this catastrophe is not over; no the problems are not solved, and yes, we should continue to be very worried.
Let me tell you why.
Three of the nuclear cores at Fukushima Daiichi are in direct contact with groundwater. Nuclear power designers and engineers never anticipated that possibility.
Nuclear reactors never shut down completely. After a uranium atom splits to create its power, the radioactive rubble left behind remains physically hot for about 5 years. So when the earthquake and tsunami destroyed the cooling systems at Fukushima, the nuclear fuel pellets that are usually contained in suspended fuel rods melted and wound up on the bottom of the 8-inch thick nuclear reactor. The steel from the reactor then melted too, which is called a melt-through, leaving the hot nuclear core lying on the floor of the 4-foot thick concrete containment. Fukushima Daiichi units 1,2, and 3 were destroyed by the heat and radiation inside, allowing holes and cracks to form.
Did the nuclear fuel melt through the concrete too?
We know for sure that the Fukushima Daiichi containments are full of holes that allow groundwater to come in direct contact with each nuclear core. Whether or not the nuclear fuel melted through the concrete does not matter to the environment or the people of Fukushima.
Unfortunately, this groundwater is still leaking in and leaking out, *at a rate of at least 300 tons per day*.
Lets put that number in perspective.
1. This picture is of a tanker truck.
2. Each tanker truck carries 5,000 gallons of water, which is equal to 40,000 pounds or 20 tons.

3. For you to have an idea of how much 300 tons of radioactive water is, imagine filling 15-tanker-trucks with radioactively contaminated water each day.
4. Now remember that more than 1,500 days have passed since the disastrous triple meltdown at Fukushima Daiichi and multiply that times 15 truckloads each day. Thus, the equivalent of 23,000-tanker truckloads of radioactive water have already leaked into the Pacific Ocean.
5. Worse yet, there is no end in sight.

During the first month following the Fukushima catastrophe, Fairewinds said that it was imperative that TEPCO stop the inflow of water to the site in order to prevent serious groundwater contamination.

1. Think of an overflowing bathtub
2. During the past four years, instead of stopping the inflow of water to the site, TEPCO just keeps adding more bathtubs to collect the overflowing water
3. The real solution is to turn off the tap! Stop the groundwater flow.
4. As Fairewinds anticipated, the Ice Wall is a complete failure.
5. **Groundwater experts from around the world have contacted Fairewinds many times to discuss their proven methods and technologies that would stop the inflow of water to the Fukushima Daiichi site, but TEPCO and the Japanese Government have continued to ignore experts in these technologies.**
6. There are ways to stop the groundwater. TEPCO is just not listening.

Viewers keep asking Fairewinds about the difference between the meltdown at Chernobyl in the Ukraine and the triple meltdown at Fukushima Daiichi in Japan. The major difference right now is that the nuclear core at Chernobyl never came in contact with the groundwater. Here is a picture of the core, taken in 1987, one year after the Chernobyl disaster. It is called the elephant's foot

Even today, almost 30 years later, if people stood in the room with the elephant's foot shaped melted core, everyone would die in eight minutes.

Unlike Chernobyl, no one knows where the THREE melted nuclear cores are at Fukushima Daiichi. What is known is that the three cores are in *direct contact* with groundwater. As groundwater comes down from the hillside and infiltrates the site, it becomes contaminated with radioactivity. Then that radioactive water continues its movement and flows out of the reactors and into the surrounding area severely contaminating the ground and other water it touches as it continues its migration to the ocean. The ongoing migration of extremely radioactive water at Fukushima Daiichi is making the cleanup 100 times more complicated and 100 times more expensive than Chernobyl. To date, the cleanup of the Chernobyl site has cost more $3 Billion without adding in the cost of the ongoing exclusion zone wildfires that are spewing massive amounts of radioactivity back into the atmosphere. Fukushima will cost half a trillion.

To date at Fukushima Daiichi, not only have the equivalent of 23,000 truckloads of radioactive water been leaked into the Pacific Ocean, but the soil under the nuclear plants is now highly radioactive as well. The expanding radioactive contamination will necessitate at least a quarter of a million truckloads of radioactive dirt to be removed. What place on earth would willingly take that waste and how would it ever be contained for the 250,000 years necessary?

The press and scientists need to ask, "Why is the Ukrainian government waiting at least 100 years to attempt to decommission Chernobyl, while the Japanese Government and TEPCO claim that Fukushima Daiichi will be decommissioned and dismantled during the next 30 years?"

Quite honestly, the answer has nothing to do with science, and everything to do with politics and money. To understand Fukushima Daiichi, the press needs to follow the money.

Before the Fukushima Daiichi triple meltdown, Japan's nuclear industry had 54 operating nuclear reactors. All are presently shut down.

However, every nuclear reactor in Japan that has been shutdown for the last four years has maintained their full staff of engineers, operators, etc even though they have produced no power during that time. Why? Where did the money come from to pay the approximately 700 employees at each of the shutdown 50 nuclear reactors?

The answer is that the Japan's Energy Corporations borrowed tens of billions of dollars from Japan's banks in order to pay nuclear power plant staff during the last four years.
The only way Japan's banks can be compensated for this tremendous cash outlay is if those shutdown nuclear plants are restarted. My contacts in Japan continue to tell me that the banks are putting enormous pressure on Japan's Parliament to start up Japan's nuclear reactors so the banks can get paid back for their investments.
Polls show that vast majorities of Japanese people are against restarting any nuclear reactors in Japan. In an effort to convince the Japanese people, who no longer want nuclear power plants, that restarting these old nuclear reactors can be done cleanly and safely in earthquake fault zones and coastlines at risk for tsunamis, both Tokyo Electric and Japan's government are attempting to showcase the decommissioning and dismantlement of the Fukushima Daiichi site, long before it is even feasible from a radiological contamination standpoint.
What is the truth that the Japanese people need to know?
1. It is impossible to dismantle and cleanup the Fukushima Daiichi site in 30 years. It will take longer than 100 years to do that cleanup.
2. Radioactive cesium, strontium and plutonium from Fukushima Daiichi will continue to bleed into the Pacific Ocean for decades because the groundwater flow is unmitigated.
3. The radioactive waste in at least one quarter of a million dump truck loads will have to be dumped somewhere in Japan in a shielded and contained area to prevent radiological contamination of a new area of Japan.
4. Thousands of young people involved in the decommissioning, demolition, and dismantlement of the highly radioactive site would receive huge radiation exposures.
5. The cost to cleanup the Fukushima Daiichi triple meltdown site will approach half of $1 trillion.
6. And finally, there is no place in Japan, or in the world, to store the three melted nuclear cores once they are finally removed, if it is even possible to secure and remove them. This is a technological feat that no engineer in the world has ever envisioned, since the nuclear industry never believed such a catastrophe could or would occur.
I believe that the Japanese people would not approve the restart of Japan's old reactors if they were informed of how environmentally damaging and astronomically expensive the cleanup of Fukushima Daiichi really is.
What does the world see? It sees the Japanese government and the world's nuclear industries continuing their promotion of nuclear power, while Japan's Press looks on silently due to the real threat and constraints of the government's secrecy act forbidding discussion of such issues. The true human, financial, and environmental costs of this nuclear power catastrophe are not publicized and discussed.
I'm Arnie Gundersen for Fairewinds Energy Education, and we will keep you informed.
http://www.fairewinds.org/nuclear-energy-education/fukushima-daiichi-decommissioning-follow-the-money

July 27, 2015

Toru Ogawa head of research center for decommissioning

Nuclear expert tasked with leading Fukushima decommissioning

http://www.japantimes.co.jp/news/2015/07/27/national/nuclear-expert-tasked-with-leading-fukushima-decommissioning/#.VbdP-fnwmif

by Yukie Saburi
Kyodo

Toru Ogawa, a 64-year-old nuclear research expert, has been entrusted with probably the most challenging task facing Japan — leading the decommissioning process at the Fukushima No. 1 nuclear plant.

This April, Ogawa, a professor at Nagaoka University of Technology in Niigata Prefecture, was installed as the first chief in the Collaborative Laboratories for Advanced Decommissioning Science, a government-funded research center supporting the decommissioning.

"Our research and development must be flexible based on our analysis of the (March 2011) accident and information collected by robotic probes (in the reactor buildings)," Ogawa said during a recent interview.

The center started out with a workforce of 80 within the Japan Atomic Energy Agency based in Tokai, Ibaraki Prefecture, as a research base for decommissioning the plant, which is plagued by increasing amounts of contaminated water.

Looking back on the disaster, which was triggered by the powerful Great East Japan Earthquake and tsunami in March 2011, Ogawa said, "The government and the agency should have envisioned the worst-case scenario, in which all multiple layers of defense are destroyed."

When the plant lost nearly all of its power sources and consequently the ability to cool the reactors and spent fuel pools, units 1, 2 and 3 suffered core meltdowns, while hydrogen explosions damaged the buildings housing reactors 1, 3 and 4.

"We will certainly need technological support from abroad," Ogawa said.

He added that "we can't carry out the decommissioning task" unless the center receives support and expertise from the United States, which experienced a meltdown at its Three Mile Island power plant in 1979, and other countries that have disposed of military nuclear waste.

Ogawa said he wants to **increase the total workforce at the center to some 150 by inviting around 10 Japanese and foreign experts each year.**

The center will be moved closer to Fukushima No. 1 during fiscal 2016, which begins next April 1.

A native of Yokohama, Ogawa studied nuclear engineering at Tohoku University in Sendai.

The focus of his research was on high-temperature gas reactors — the next generation reactor known to have a lower risk of core meltdowns, rather than commercial light-water reactors like the ones at Fukushima No. 1.

In researching what will be needed to complete the decommissioning project, which will take several decades, he is currently assessing the state of the melted fuel in reactors 1, 2 and 3, putting together a puzzle with small scraps of information obtained by robotic probes in the reactor buildings.

July 28, 2015

Removing No.1 cover

The interior of the No. 1 reactor building of the Fukushima No. 1 nuclear power plant can be seen from above after a canopy panel was removed on July 28. (Eiji Hori)

TEPCO removes canopy panel from Fukushima reactor building

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201507280071

By HIROMI KUMAI/ Staff Writer

OKUMA, Fukushima Prefecture--Tokyo Electric Power Co. on July 28 started removing a canopy covering a damaged reactor building at the Fukushima No. 1 nuclear plant to prepare for the eventual extraction of spent nuclear fuel inside.

Around 7 a.m., workers using a giant crane lifted away the first of six canopy panels, each measuring 40 meters long and 7 meters wide, from the No. 1 reactor building.

The 30-minute removal of the panel left a large hole in the canopy through which steel beams on the damaged upper part of structure could be seen from above. **Workers closely monitored radiation levels in the surrounding areas during the removal process.**

The utility plans to remove the remaining five panels from next week.

The removal of the canopy will allow TEPCO to clear debris inside the building, possibly in the latter half of fiscal 2016. That process should **pave the way for the removal of nuclear fuel rods from the spent fuel pool in the building.**

Before removing the canopy panel, the utility sprayed the inside of the reactor building with liquid resin through holes drilled in the cover to prevent radioactive materials from being stirred up during the dismantling work.

TEPCO initially planned to start removing the canopy panels from the No. 1 reactor building in summer 2014, but the schedule was delayed because a large amount of radioactive substances was released into the environment when the utility removed debris from the No. 3 reactor building in August 2013.

Even after the anti-scattering resin was sprayed into the No. 1 reactor building in May, removal of the canopy panel was **postponed by a problem inside the building**.

Work begins to dismantle cover at Fukushima plant

http://mainichi.jp/english/english/newsselect/news/20150728p2g00m0dm069000c.html

TOKYO (Kyodo) -- The operator of the disaster-hit Fukushima Daiichi nuclear plant began Tuesday dismantling the cover shrouding the No. 1 reactor building, installed in the wake of the 2011 disaster to keep radioactive materials from dispersing.
Tokyo Electric Power Co. workers removed one of the six panels, each about 7 meters in width and about 42 meters in length, using a crane.
With the removal of the panel, the upper part of the reactor building, which was destroyed by a hydrogen explosion, became visible for the first time since last December, when part of the cover was temporarily removed.
The utility plans to complete the whole cover removal process in fiscal 2016, which begins next April, and clear debris and install equipment before beginning to take out the 392 spent fuel assemblies from the building's pool in fiscal 2020.
Takao Kikori, a senior nuclear safety official at the Fukushima prefectural government, called for care to be taken in conducting the dismantling work for the safety of local people.
The utility plans to remove the second panel in early August or later and complete the removal of all six panels by the end of this year. It also plans to later remove panels on the sides of the reactor building and install windbreaker sheets for debris clearing work.
The reactor building cover was installed in October 2011 as an emergency measure to keep radioactive dust from scattering. The utility initially planned to dismantle it in fiscal 2013 or 2014 but was forced to put off the work to take additional dust control and other measures.

Dismantling of reactor building cover begins

http://www3.nhk.or.jp/nhkworld/english/news/20150728_13.html

The operator of the damaged nuclear power plant in Fukushima has begun work to remove the cover of the Number 1 reactor building, a step toward decommissioning the plant.

Workers are using a remote-controlled crane to remove one of the panels of the ceiling.

Tokyo Electric Power Company, or TEPCO, installed the cover after the 2011 accident to prevent the dispersal of radioactive materials. But the utility needs to remove it to allow the clearing of debris and removal of nuclear fuel in a spent fuel storage pool.

The operator plans to take several months to remove the 6 panels of the ceiling. It plans to then dismantle the cover while clearing debris.

The utility says it expects to complete the task around the winter of 2016.

The dismantling of the cover was originally due to start in July last year. But TEPCO delayed the operation after people living nearby expressed concerns over the possible spread of radioactive materials.

The utility postponed the work again in May this year as it found **a problem with a device that controls the air flow in the building.**

TEPCO has sprayed chemical agents on the debris in the building to prevent radioactive particles from being released into the air.

The operator says it will keep a closer watch on radiation levels and make information public during the work.

July 29, 2015

Removal of debris to start in No.3

Removal of debris in spent fuel storage to start

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Workers at the Fukushima Daiichi nuclear power plant on Sunday will start the removal of a fuel exchanger inside the Number 3 reactor building. The 20-ton device fell into the fuel pool during the 2011 disaster.

The device has since been a major obstacle for workers at Tokyo Electric Power Company in the start of removal of extremely radioactive rubble left in the storage pool. 566 fuel rods remain inside the spent fuel pool.

Workers cannot directly take part in the process as the site is highly radioactive. The work will require 2 remote-controlled cranes that will lift and remove the device, which is some 14 meters long.

The work poses a challenge as spent fuel may suffer damage if the device falls back into the pool during removal.

Workers accidentally dropped a 400-kilogram device into the pool last August. Though none of the rods suffered damage, removal was postponed for 4 months.

TEPCO has been preparing for the removal by developing equipment tailored to grip the device. Cushions have also been placed on top of the fuel rods.

TEPCO officials say all other work to decommission the plant will be suspended while the removal takes place as a hydrogen explosion in 2011 left the pool without a roof.

August 19, 2015

Tepco Holding Company

Tepco Holding Company To Take Charge Of Fukushima Decommissioning

http://www.nucnet.org/all-the-news/2015/08/19/tepco-holding-company-to-take-charge-of-fukushima-decommissioning

The Tokyo Electric Power Company (Tepco) will spin off its non-nuclear businesses into three subsidiary companies as of 1 April 2016, keeping its nuclear business and the decommissioning related to the March 2011 Fukushima-Daiichi accident in the parent holding company, Tepco has said. Tepco said it will spin off its fuel and thermal power generation into Tepco Fuel & Power Inc., its transmission and distribution network operation into Tepco Power Grid Inc., and its electricity retail business into Tepco Energy Partner Inc. The changes will help the company "adopt the most effective business strategy possible", Tepco said.

The three subsidiaries will be part of the Tepco Holding company, which will be in charge of its nuclear energy assets, including the "compensation, decommissioning and revitalisation related to the Fukushima nuclear accident," Tepco said. It will directly employ about 7,900 people for nuclear power generation and decommissioning.

The aim of the corporate reorganisation is for Tepco to generate resources for the decommissioning of the Fukushima-Daiichi station and to improve the company's value by building a sustainable revenue base.

Tepco also said it has signed a letter of intent to promote the development of two 540-megawatt coal-fired power plants in Fukushima prefecture together with Mitsubishi Heavy Industries, Mitsubishi Corporation, Mitsubishi Electric Corporation and Joban Joint Power Company, which will form a "Fukushima Revitalization Power Consortium".

Tepco is undertaking the coal power plant projects as part of its contribution to the revitalisation of Fukushima prefecture and aim to support the local economy by creating an industrial base and job opportunities, Tepco said.

In February 2012, Tepco received a government bailout worth about 11 trillion Yen (then about $137 billion; €106 billion) related to the decommissioning of the Fukushima-Daiichi station, compensation of the evacuees from Fukushima prefecture and the company's continuing operations.

In April 2014, Tepco said it intended to "bolster" efforts to award compensation to those affected by the accident with total payouts expected to be in the region of $47 billion (€34 billion). The total cost of the accident has been estimated by the Japanese government at $100 billion and decommissioning costs have been put at around $20 billion, according to Tepco's business plan.

In July 2015, Tepco announced a 203 billion Yen ($1.65 billion; €1.5 billion) net profit for the second quarter of 2015, compared to a 173 billion Yen loss in the same period in 2014, mainly due to low oil prices and cost-cutting measures, the Bloomberg news agency reported.

September 23, 2015

TEPCO's agreement with French CEA

TEPCO to sign cooperation pact with France's CEA

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

NHK has learned that the operator of the crippled nuclear plant in Fukushima plans to sign an agreement with a French organization to obtain the necessary technology to decommission the facilities.

Tokyo Electric Power Company, or TEPCO, will initially focus on decontaminating the areas around the reactor containment vessels.

The removal of molten nuclear fuel will be the toughest challenge in the decontamination process because of the extremely high radiation levels.

TEPCO plans to obtain technical knowhow from the Alternative Energies and Atomic Energy Commission, or CEA, which is funded by the French government. The French organization has expertise in dismantling aged nuclear reactors and fuel-reprocessing facilities.
Sources say that under the agreement, the CEA will help TEPCO to develop remote-controlled robots that can withstand high radiation levels.

The CEA will also help with training workers and TEPCO will provide data for the decommissioning process.

This will be TEPCO's second agreement with a foreign organization. Last year, it signed a pact with a British company to address the buildup of contaminated water.

October 5, 2015

Last cover panel removed from No.1

Last ceiling panel removed from Fukushima reactor

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Workers at the Fukushima Daiichi nuclear power plant have removed the last remaining ceiling panel covering a damaged reactor building. It is part of efforts to take out spent nuclear fuel from the building.

On Monday, the workers used a **remote controlled crane to lift the panel**, measuring 42 meters by 7 meters, from the No. 1 reactor building.

Scattered debris near the spent nuclear fuel pool can now be seen from outside.

The plant's operator, Tokyo Electric Power Company, says **there has been no change in radiation levels around reactor buildings.**

The No.1 reactor building was damaged in the 2011 accident. TEPCO installed a cover around it to prevent radioactive materials from escaping.

In July, the utility began removing 6 ceiling panels that make up the cover. Workers plan to take out 392 units of fuel from the pool in the reactor building where they are being stored.

But work needs to be done to clean up debris around the pool before removing the spent fuel.

TEPCO officials told reporters that the entire cover needs to be demolished before the spent fuel can be removed. They say top priority will be placed on safety during the process.

October 6, 2015

TEPCO removes final canopy panel at damaged Fukushima reactor building

Tokyo Electric Power Co. finished dismantling a canopy covering a damaged reactor building at the Fukushima No. 1 nuclear power plant to allow workers to start removing debris.
The operation, which began in July and was completed Oct. 5, brings the process of eventual extraction of spent nuclear fuel a step closer.
A giant crane was used to raise each of the six canopy panels, each 40 meters long and 7 meters wide, above the stricken plant's No. 1 reactor building.
TEPCO officials said grit and dust contaminated with radioactive substances were contained during the work.
TEPCO plans to shortly start removing panels covering the flanks of the reactor building. At the same time, it will try to assess the state of rubble on upper parts of the No. 1 reactor building.
The plant operator will then begin clearing debris at the reactor building, which was damaged by a hydrogen explosion when cooling systems failed after the 2011 earthquake and tsunami disaster. It expects to start the work in the latter half of fiscal 2016.

October 19, 2015

Abe promises Govt. support in decommissioning

Abe pledges gov't action in decommissioning Fukushima plant

http://mainichi.jp/english/english/newsselect/news/20151019p2g00m0dm074000c.html

OKUMA, Japan (Kyodo) -- Prime Minister Shinzo Abe pledged Monday that the central government will take the initiative in decommissioning the Fukushima Daiichi nuclear power plant devastated by the March 2011 earthquake and tsunami in northeastern Japan.
Visiting the town of Okuma, which hosts the crisis-hit Tokyo Electric Power Co. complex, to check its recovery from the disaster, the prime minister told Okuma Mayor Toshitsuna Watanabe that the central government "will try to ensure (the reconstruction) plan will make progress."
Following the nuclear accident, all residents remain evacuated with functions of the town government relocated to the Fukushima city of Aizuwakamatsu, some 100 kilometers west of the municipality.
Later in the day, Abe visited the town of Naraha, also in Fukushima, where an evacuation order issued after the nuclear crisis was lifted in early September.
In a meeting with five people who returned to Naraha, Abe said his government will "cooperate with the municipal government to fully support" them in rebuilding their life.
The prime minister also attended an opening ceremony of a research facility focused on the decommissioning of the nuclear plant. He was briefed there about a robot that can be remotely controlled while inspecting the interior of nuclear reactors.

Abe pledges government action in decommissioning Fukushima No. 1

http://www.japantimes.co.jp/news/2015/10/19/national/politics-diplomacy/abe-pledges-government-action-in-decommissioning-fukushima-no-1/#.ViUwSivwmos

Kyodo
OKUMA, FUKUSHIMA PREF. – Prime Minister Shinzo Abe pledged Monday that the central government will take the initiative in decommissioning the Fukushima No. 1 nuclear plant. […]

October 20, 2015

Opening of decommissioning facility

Fukushima decommissioning research facility opens

http://www3.nhk.or.jp/nhkworld/english/news/20151020_22.html

A research facility that will aid the process of decommissioning the Fukushima Daiichi nuclear power plant has partially opened in the town of Naraha, near where the plant is located.

The Japan Atomic Energy Agency is building a complex in the Fukushima Prefecture town at a cost of some 84 million dollars.

The technology developed by the engineers will be used to control robots and confirm procedures are followed in areas where the radiation levels are too high for humans to enter.

Prime Minister Shinzo Abe, Naraha Mayor Yukiei Matsumoto and some 100 others attended the opening ceremony for one of the 2 major buildings in the complex on Monday.

With the aid of special equipment and glasses, visitors were able to see a three-dimensional image of the inside of a building housing a nuclear reactor.

The visitors were shown where remote-controlled robots essential for the decommissioning work will be developed. Researchers will test the robots' ability to negotiate debris fields by using pieces of wood to create uneven surfaces in the lab.

JAEA President Toshio Kodama said he hopes to make use of know-how from across Japan and around the world to develop high-quality and low-cost decommissioning technology so that Fukushima can recover as quickly as possible.

A full-scale model of part of the troubled reactor vessel at the plant will be built inside a test building that is to go into full operation next April.

JAEA opens Fukushima R&D center for decommissioning reactors

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201510200081

By CHIKAKO KAWAHARA/ Staff Writer
NARAHA, Fukushima Prefecture--The Japan Atomic Energy Agency officially christened its new facility here on Oct. 19 that will develop technologies to decommission the reactors at the crippled Fukushima No. 1 nuclear power plant.

The Naraha Remote Technology Development Center will conduct research to develop remote-control decommissioning technologies as radiation levels within the reactors remain too high for workers to enter following a triple meltdown in the aftermath of the 2011 Great East Japan Earthquake and tsunami.
The opening ceremony was attended by 105 people, including Prime Minister Shinzo Abe, science and technology minister Hiroshi Hase and Fukushima Governor Masao Uchibori.
"The decommissioning process is a lengthy one that will take up to 40 years," Abe said. "This facility was set up to consolidate the world's knowledge to face the unknown."
Featuring a life-sized mock-up of a damaged reactor and virtual reality systems, the center will test new machines and methods to remotely remove nuclear fuel from the Fukushima plant.
Experts hope that research and development at the facility will lead to a reduction in the number of failures of devices deployed at the crippled plant.
Abe witnessed a demonstration of a new scorpion-shaped robot, which will eventually be deployed inside the No. 2 reactor at the Fukushima plant.
The Naraha center will also erect in March a life-sized model of a reactor suppression chamber located beneath the containment vessel that was damaged in the 2011 disaster. Because the containment vessel has to be filled with water to remove the melted fuel inside, researchers plan to first develop technology to patch up the container to prevent leaks.
The facility is also equipped with a virtual reality system that projects onto a screen a computer-generated world simulating the space inside the damaged reactor buildings. The interior layouts of the crippled buildings are based on data collected by remote control robots deployed at the plant.
The technology will devise routes in removing melted fuel, along with coming up with methods to minimize the amount of radiation that workers will be exposed to.
The JAEA is also setting up a facility in Okuma to monitor the amount of radioactive materials inside the plant grounds. A total of 85 billion yen ($711.4 million) will be used to build the two JAEA facilities.
"There are still 100,000 people evacuated from the disaster," said Toshio Kodama, JAEA president.
"We hope to fulfill the role the JAEA is meant to play in the decommissioning process."

Endoscopy of No.3

TEPCO conducts endoscopy of No.3 reactor

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The operator of the damaged Fukushima Daiichi nuclear plant has conducted the first endoscopic probe of the container that houses the core of its Number 3 reactor.

Workers with Tokyo Electric Power Company on Tuesday inserted cameras and other measuring instruments into a pipe leading to the inside of the reactor containment vessel. The unit suffered a meltdown in the March 2011 disaster, along with 2 other reactors.

The workers found radiation levels in the vessel as high as one sievert per hour. The levels were lower than those measured in the containers of the Number 1 and 2 reactors. They also confirmed that the vessel was filled with water to a height of about 6.4 meters.

The operator says Tuesday's survey found no major damage to the facility as far as it could see.

TEPCO officials suspect that most of the nuclear fuel in the reactor melted through the core and dropped into the containment vessel.

But the workers were not able to see the bottom of the vessel, as what appears to be accumulated dust in the water was in the way of the endoscope.

TEPCO plans to conduct a similar operation on Thursday. The officials will also discuss the timing of robotic probes based on the results of the endoscopy.

The utility had earlier conducted endoscopic and robot inspections of the interiors of the Number 1 and 2 reactors.

Tepco sends camera into reactor 3 containment vessel at Fukushima No. 1

http://www.japantimes.co.jp/news/2015/10/20/national/tepco-set-send-camera-containment-vessel-reactor-3-fukushima-no-1-plant/#.ViaEMCvwmos

Tokyo Electric Power Co. for the first time has inserted remote-controlled cameras into the containment vessel of reactor 3 at the Fukushima No. 1 nuclear plant to gauge the extent of the damage from the core meltdown.

After the probe, Tepco said water inside the containment vessel was about 6.5 meter deep, about the same as it had estimated. The level of radiation was quite high at 1 sievert, while the water temperature was 33 to 35 degrees.
There was no visible damage inside the vessel, the utility said.
Tuesday's operation was conducted ahead of a planned inspection using a robot to pinpoint the location of and situation surrounding the melted fuel. How to remove the melted fuel has been a huge question in the process to decommission the power plant.
On Tuesday, the utility inserted a camera into the vessel with equipment to measure radiation levels and to photograph the area above the surface of the water. Tepco will then lower a camera with a thermometer toward the bottom of the container to check the situation under the water surface.
A few days later, the company will collect water samples from inside the container to check for radioactive substances and chloride concentrations.
In April, Tepco conducted an inspection using a robot inside reactor 1. It also plans to carry out a similar inspection inside reactor 2. The water level is believed higher inside reactor 3 than in the other two units.

Anti-terrorism measures wanted

Panel urges anti-terror steps for nuclear plants

http://www3.nhk.or.jp/nhkworld/english/news/20151020_09.html

A panel advising Japan's nuclear regulator has proposed measures to help nuclear facilities avoid hiring terrorists posing as workers.

The Nuclear Regulation Authority panel has been studying a system for checking the criminal records and other personal information of workers at nuclear facilities.

The International Atomic Energy Agency has urged countries to run background checks on workers in the wake of the 2001 terrorist attacks in the United States.

Japan is believed to be the only country with nuclear power plants without such a system.

The panel said in a report on Monday that the operators of nuclear facilities should require certain workers to self-report information about their medical history, including alcohol and drug addiction. The affected workers would include those with access to critical areas or who are involved in guarding nuclear materials.

They would also be asked about their financial standing, including history of personal bankruptcy and debt. Further questions would address a possible criminal record and links to terrorist groups.

The panel also urged the operators to place more security guards at their facilities and use biometric identification systems.

Some on the panel questioned the effectiveness of self-reporting and called for more rigorous information gathering.

But the panel stopped short of recommending using criminal background checks, citing possible

privacy infringement. Other major countries use such a system.

The Nuclear Regulation Authority plans to create a new screening system based on the panel's report.

October 21, 2015

Endoscopy of No.3 (2)

TEPCO for 1st time studies inside No. 3 containment vessel at Fukushima plant

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201510210039

More than four years after the triple meltdown, Tokyo Electric Power Co. on Oct. 20 got its first look inside the containment vessel of the No. 3 reactor at the Fukushima No. 1 nuclear plant.
Images from an industrial endoscope inserted into the containment vessel along a wall confirmed no damage to pipes and other equipment, according to TEPCO.
The early survey results for the days-long study also found radiation levels inside the containment vessel were 1 sievert per hour, a reading too high for humans to work there.
TEPCO also said 6.4 meters of water had accumulated on the bottom of the containment vessel, which was in line with the utility's estimate.
Water temperatures were 33 to 35 degrees and air temperatures were 26 to 27 degrees inside the vessel, according to TEPCO.
The survey is being carried out to prepare for the eventual extraction of melted fuel from the containment vessel.
TEPCO carried out endoscope surveys at the containment vessels for No. 1 and No. 2 reactors in 2012.
The radiation level at the No. 3 reactor was lower than those at the No. 1 and No. 2 reactor buildings.

October 21, 2015

First images of Fukushima plant's No. 3 reactor vessel interior captured

A camera sent inside the No. 3 reactor containment vessel at the Fukushima Nuclear Power Plant on Oct. 20 -- the first time since a March 2011 reactor meltdown -- captures an image of scaffolding and pillars, as well as ripples in the water pooled at the bottom. (Photo courtesy of TEPCO)
http://mainichi.jp/english/english/newsselect/news/20151021p2a00m0na008000c.html

FUKUSHIMA -- Tokyo Electric Power Co. (TEPCO) on Oct. 20 captured the first images from inside the Fukushima No. 1 Nuclear Power Plant's No. 3 reactor containment vessel since a triple meltdown at the power station in March 2011.
(Scroll down for video)

On the morning of Oct. 20, TEPCO inserted two cameras equipped with both a dosimeter and a thermometer through a hole in the containment vessel wall. Radiation levels inside the vessel proved to be extremely high, at a maximum of approximately 1 sievert per hour. Radiation-tainted water pooled at the bottom of the vessel was about 6.5 meters deep -- close to a previous TEPCO estimate.

An image captured by a camera sent inside the No. 3 reactor containment vessel at Fukushima No. 1 Nuclear Power Plant for the first time since the reactor's 2011 meltdown. (Photo courtesy of TEPCO) Click to enlarge

Meanwhile, at 26-27 degrees Celsius, temperatures inside the vessel were higher than temperatures outside, and water temperatures were between 33 and 35 degrees.

While the cameras captured scaffolding used for pipework inspections, no evidence of damage to the vessel structure could be confirmed within the camera's field of vision. At times, static interfered with the images due to the high radiation levels. A mud-like substance could be seen spreading inside the contaminated water when the cameras moved.

Two camera-equipped robots were dispatched inside the nuclear power plant's No. 1 reactor containment vessel in April to obtain images and data. Another robot was sent to check the inside of the No. 2 reactor in 2012, but the latest inspection marked the first time a camera was sent inside the No. 3 reactor.

TEPCO is set to collect radiation-tainted water from the containment vessel as early as Oct. 22 to analyze the concentration of radioactive substances in the water.

An image captured by a camera sent inside the No. 3 reactor containment vessel at Fukushima No. 1 Nuclear Power Plant for the first time since the reactor's 2011 meltdown. (Photo courtesy of TEPCO)

October 24, 2015

Decommissioning facility (2)

Decommissioning technology key to rebuilding Fukushima: new reconstruction minister

http://www.japantimes.co.jp/news/2015/10/24/national/politics-diplomacy/decommissioning-technology-key-rebuilding-fukushima-new-reconstruction-minister/#.Vitteyvwmov

JIJI

Reactor decommissioning technology will be the key to Fukushima Prefecture's recovery from the March 2011 nuclear disaster, Tsuyoshi Takagi, the new post-disaster reconstruction minister, said in a recent interview.

The facility has been established in Naraha near Tokyo Electric Power Co.'s crippled Fukushima No. 1 power plant to develop robots for the decommissioning work, he said.

"The key for reconstruction will be whether the prefecture can be a magnet for globally competitive technologies," Takagi said.

The government has begun restarting nuclear power plants that pass the new regulator's safety screenings, which are said to be the strictest in the world.

"But I don't think that the remaining nuclear plant in Fukushima should be treated in the same way as others," Takagi said, adding, "Everything depends on how local residents think about the plant."

"We have to make efforts to rebuild the prefecture, while learning lessons from the nuclear accident that should not have occurred," Takagi said.

Asked about how to rebuild areas hit by the March 2011 earthquake and tsunami, Takagi said new housing, which is set to peak next year, is one of the priorities.

"Also high on the agenda are providing physical and mental care for affected residents and forming local communities," Takagi said.

He also said "creating places for people to work is important." Subsidies will be provided to help job creation and capital spending by affected companies, Takagi said.

“Every effort will be made to revitalize local industries and livelihood,” he said.
In addition, Takagi expressed his willingness to make use of the 2020 Tokyo Olympics and Paralympics to let the world know about the progress in rebuilding the disaster-hit parts of the Tohoku region.
The region hopes to host training camps and first-round games related to the Games, Takagi said.
More visitors have come to Japan in recent times, but the number visiting the Tohoku region still falls short of predisaster levels, Takagi said. “We’d like to make efforts to promote tourism in the region.”

October 30, 2015

Extremely high radiation levels stall checks

Deadly 9.4 sieverts detected outside Fukushima reactor 2 containment vessel; checks stop

http://www.japantimes.co.jp/news/2015/10/30/national/deadly-9-4-sieverts-detected-outside-fukushima-reactor-2-containment-vessel-checks-stop/#.VjOVICt1BLN

JIJI

Tokyo Electric Power Co. said Thursday that radiation levels of up to 9.4 sieverts per hour have been detected outside a reactor containment vessel at the meltdown-hit Fukushima No. 1 nuclear power plant.
People exposed to the maximum radiation dose for some 45 minutes will die. Tepco expects decontamination work to take at least one month.
Sept. 4-25 checks found the extremely high radiation levels at a cell that accommodates a pipe connected to the containment vessel of reactor 2 at the plant, which was devastated by the March 2011 earthquake and tsunami, Tepco said.
The highest contamination was detected on the floor. Details behind the situation are unknown, according to the company.
Tepco planned to start in August to check the inside of the containment vessel by using a remote-controlled robot but high radiation levels have stalled the examination.
Extremely high radiation levels and the inability to grasp the details about melted nuclear fuel make it impossible for the utility to chart the course of its planned decommissioning of the reactors at the plant.

November 27, 2015

Remove top part of No.2 reactor before removing 615 fuel assemblies

TEPCO to dismantle top part of Fukushima No. 2 reactor building by fiscal 2018

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201511270048

By HIROMI KUMAI/ Staff Writer
Tokyo Electric Power Co. plans to remove the top part of the No. 2 reactor building at the Fukushima No. 1 nuclear plant by fiscal 2018 to empty a nuclear fuel storage pool inside.

Dismantling work will start next summer at the earliest, the utility said Nov. 26.
The No. 1, No. 2 and No. 3 reactors at the plant melted down after the Great East Japan Earthquake and tsunami struck in March 2011. Hydrogen explosions destroyed the No. 1 and No. 3 reactor buildings, but the No. 2 reactor building remained relatively intact.
The utility said it will come up with a plan in two years on how to remove the 615 nuclear fuel assemblies in the storage pool located in the upper portion of the building. It intends to start removing the fuel assemblies in fiscal 2020.
One tricky part of the dismantling work will be ensuring that radioactive materials do not escape from the building. Airborne radiation levels above the building in 2013 exceeded 800 millisieverts per hour at some locations.
TEPCO plans to spray synthetic resins and take other measures to contain radioactive dust during the dismantling process. It is also considering installing a cover over the building to prevent radioactive materials from spreading when it tears down the building walls using heavy machinery.
TEPCO had considered removing only part of the uppermost portion of the building to contain the large amount of radioactive materials inside. But the company decided to dismantle the entire top-level portion to make it easier to remove contaminated debris and nuclear fuel.

December 15, 2015

Decommissioning Fukushima no.1: A daunting task

Fukushima decommission chief: 'No textbook' for cleanup

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201512150079

THE ASSOCIATED PRESS
The man leading the daunting task of dealing with the Fukushima nuclear plant that sank into meltdowns in northeastern Japan warns with surprising candor: **Nothing can be promised.**
How long will it take to decommission the three breached reactors, and how will it be accomplished, when not even robots have been able to enter the main fuel-debris areas so far? How much will it ultimately cost? Naohiro Masuda, tapped last year as chief of decontamination and decommissioning for plant owner Tokyo Electric Power Co., acknowledges he is a long way from answering those questions definitively.
"This is something that has never been experienced. A textbook doesn't exist for something like this," Masuda told The Associated Press in an interview at TEPCO's Tokyo headquarters on Dec. 14.
It's only recently the daily situation at Fukushima No. 1 nuclear power plant has even started to approach "normal," he said. Since the March 2011 meltdowns, TEPCO has had to face one huge challenge after another, including storing masses of leaking radioactive water, clearing up rubble and removing fuel rods from a crumbled building.
"Before, it was a war zone," Masuda said quietly.
Masuda's approach contrasts with the sometimes ambitious, sometimes wishful announcements by the Japanese government, which pronounced the disaster "under control" as early as late 2011, just months after a devastating tsunami knocked out power to the plant, setting off the meltdowns.
But in June, the government and TEPCO acknowledged the target dates in the official "road map" for decommissioning had to be pushed back by about two years. Now even the most optimistic projections estimate the work will take about half a century.
Masuda said without hesitation that more delays could be in order. No one knows exactly where the melted nuclear debris is sitting in the reactors, let alone how exactly the debris might be taken out. Computer simulation and speculative images are all he has so far.

New science will have to be invented for the plant to be cleaned up. Each step of the way, safety and consequences must be weighed, for workers and for the environment alike, Masuda added.
Under the latest plan, the removal of the fuel debris is expected to start within a decade. Still, Masuda likened such goals to reminders not to slack off, rather than hard deadlines based on real-life assessments.
The March 2011 catastrophe is unprecedented. Unlike the 1979 partial meltdown at Three Mile Island in the United States, the containment, where the morass of fuel lies, has been breached at the Fukushima No. 1 plant. Radioactive water is piling up: 300 tons a day by the latest count. And as devastating as the 1986 Chernobyl disaster was in what is now Ukraine, that involved one reactor, not three.
When asked about what he wanted to tell the people worried about contaminated fish, such as on the West Coast of North and South America, Masuda said the radiation leak into the Pacific Ocean has been reduced to a level one-millionth of what it was in 2011.
That's equivalent to what is deemed safe for drinking water, he said. Some radiation will continue to leak through rainfall because rainwater will pick up radiation from the plant grounds, and some of it will eventually fall into the ocean.
"They don't need to worry, and, if there is anything to worry about, we will be out with that information," he said.
Masuda, who has worked for TEPCO for more than 30 years, won praise for preventing meltdowns or explosions at the Fukushima No. 2 nuclear power plant, a sister facility that also lost electricity after the 2011 tsunami. As then head of that plant, Masuda acted quickly and decisively, leading his team, despite the chaos unfolding, to connect the reactors to surviving power sources.
His company's image is much different. TEPCO's reputation in the Japanese public eye was badly tarnished because of its bumbling response in the early days of the disaster.
The utility has undergone a public bailout and has readied 2 trillion yen ($17 billion) for decommissioning. The Japanese government has earmarked 54 billion yen of public funds for researching decommissioning technology through this fiscal year.
Such money doesn't include compensation or damage lawsuits. The Fukushima catastrophe spewed radiation into the air, ocean and surrounding areas through hydrogen explosions, and displaced some 100,000 people.
The way TEPCO is spending money has drawn some criticism from experts abroad. Unlike the U.S. system, there is no open bid or escrow fund in Japan to dole out the massive decommissioning funds. Much of the work is going to the Japanese manufacturers that constructed the plants, such as Toshiba Corp. and Hitachi Ltd., under long-term contracts. Some outside international consultants are involved, and some foreign companies have gotten water-decontamination and other contracts.
Akira Tokuhiro, an American and nuclear expert who teaches at the University of Idaho, supports an open bidding process that invites more international expertise. He noted that Japan has no, or very little, decommissioning experience, compared to the Americans, the French and the Russians.
"An international effort has the potential to reduce both time and cost, while maintaining safety, transparency and cost," he said.
Douglas Chapin, of MPR, a U.S. nuclear engineering organization that has advised the American and Japanese nuclear industries, was less critical, defending the Japanese method as simply different.
Masuda said awarding contracts without opening bidding is what's best for Fukushima, and that TEPCO needs to take primary responsibility.
"We don't think competition is beneficial as that will mean people doing the work will keep changing," he said. "The system we have is better."
But Masuda also acknowledged that Japan has not done as good a job as it should have on relaying the harsh realities at the plant. He said it's his mission to relay all information, the good and the bad.
"When I took this job, I promised to work as an interpreter, to relay our work in a way that's understandable to regular people, and to communicate within the company what people are interested in and worried about," he said.

"If the interpreter is good, the conversation will be lively. If the interpreter is good, dialogue will follow."

December 16, 2015

New decontamination robot for Fukushima Daiichi

New decontamination robot for Fukushima unveiled

http://www3.nhk.or.jp/nhkworld/english/news/20151216_37.html

Engineers have unveiled a robot designed to facilitate decontamination work in reactor buildings at the crippled Fukushima Daiichi nuclear plant in northeastern Japan.

The developers showed the robot to the media on Wednesday. They include Mitsubishi Heavy Industries and the plant operator, Tokyo Electric Power Company.

The engineers say the new robot can reach upper floors and deep inside the buildings where other clean-up robots could not operate.

Decontamination work is needed before decommissioning the damaged reactors. Workers have used robots for the work in the past. But the need to supply materials to scrape off thin layers of contaminated surfaces has prevented the devices from reaching distant locations.

The new robot is made up of 4 devices connected by hoses and cables that can extend up to 65 meters.

The front device is capable of decontamination work. The 2 central devices supply chemicals and other materials. And the last one is used for communication.

Each device has been made compact so the robot can operate deep inside reactor buildings.

Tokyo Electric officials say they hope to deploy the robot at the plant after April next year.

A Mitsubishi official says the robot is capable of cleaning upper floors, so he expects it to help advance work on the reactors.

December 17, 2015

No promises in Fukushima cleanup, director says

http://www.japantimes.co.jp/news/2015/12/17/national/no-promises-fukushima-cleanup-director-says/#.VnKDAr8R-id

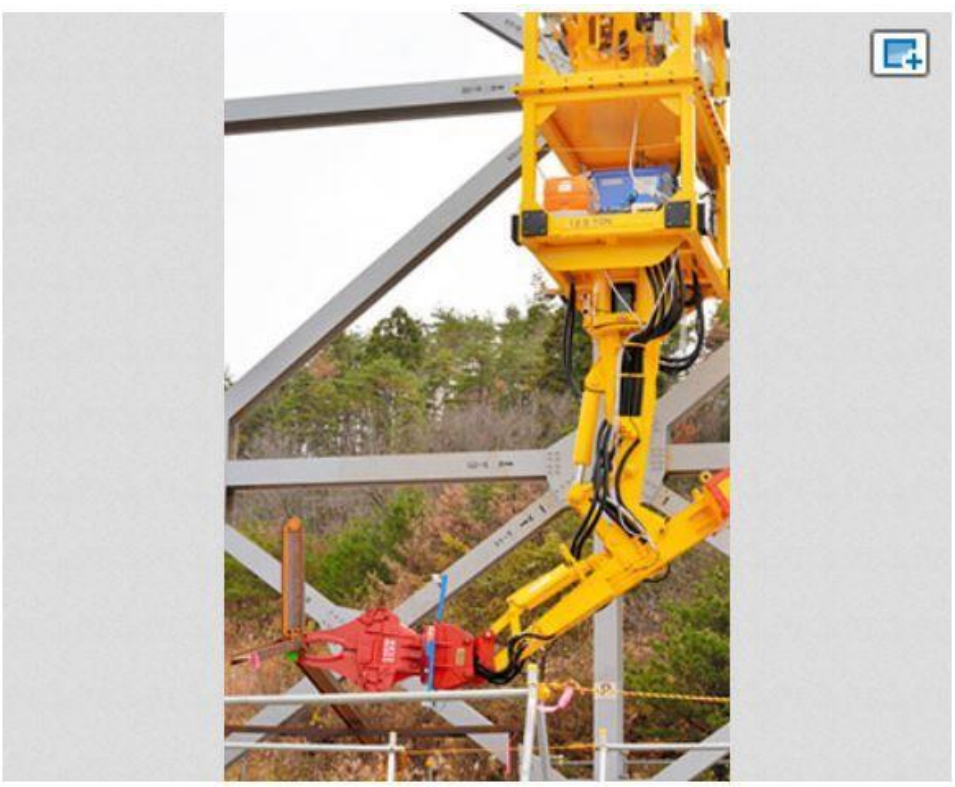
by Yuri Kageyama
AP
The man leading the daunting task of dealing with the Fukushima No. 1 nuclear plant warns with surprising candor: Nothing can be promised.[...]

December 18, 2015

Removing debris from reactor building

TEPCO preps for Fukushima No. 1 reactor building debris removal

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201512180040



Equipment gripping steel frames are operated by remote control at a mock debris removal operation on Dec. 16. (Takuro Negishi)

HIRONO, Fukushima Prefecture--Tokyo Electric Power Co. held an exercise at a mock facility here to prepare for the delicate task of removing debris from a reactor building at the crippled Fukushima No. 1 nuclear plant.
The operation on Dec. 16 used a simulated upper structure of the No. 1 reactor building, which was heavily damaged by a hydrogen explosion after the Great East Japan Earthquake and tsunami on March 11, 2011.
In the trial operation, workers extracted steel pieces using huge remote-controlled cranes equipped with specially designed plier-type hooks, which can firmly hold and cut steel frames and other materials.

A crane operator and a worker controlling the hooks worked together to hold the steel debris, keeping in close communication.
“We want to improve our technique so we can conduct the operation with accuracy,” a TEPCO official said.
The actual operation, scheduled for January 2016, aims to remove the debris from 50 places in the reactor building before installing a sprinkler system to prevent radioactive dust scattering from the reactor’s upper section.
Considering the risk surrounding the removal effort in the reactor building, where radiation levels remain high, workers will closely monitor the process with cameras.

December 21, 2015

Genkai to be scrapped

Genkai nuclear reactor marked to be scrapped

http://www3.nhk.or.jp/nhkworld/english/news/20151222_01.html

The operator of a nuclear plant in western Japan is set to submit a plan to scrap an aging reactor at the facility to the national regulator.

Kyushu Electric Power Company will file the plan with the Nuclear Regulation Authority on Tuesday. It pertains to the No.1 reactor at the Genkai plant in Saga Prefecture.

The reactor went into operation in 1975. The utility decided in April to decommission it in light of a law limiting the lifespan of a reactor to 40 years in principle.

The operator says it will require 28 years to complete the decommissioning work. The plan divides the work into 4 stages.
The 1st stage, which will take 6 years, involves removing radioactive substances from pipes and other parts of the reactor, as well as disassembling radiation-free equipment. Then, work will begin to remove spent fuel.

Nuclear plant operators in Japan have already decided to scrap 5 reactors, including one at the Genkai plant.

Kyushu Electric will be the first to submit such a decommissioning plan.

December 23, 2015

Kyushu Electric submits plan to decommission 40-year-old Genkai reactor

http://ajw.asahi.com/article/behind_news/social_affairs/AJ201512230036

Kyushu Electric Power Co. on Dec. 22 sought approval from the Nuclear Regulation Authority to start the 28-year process of decommissioning an aging reactor at its Genkai plant in Saga Prefecture.

It is the first reactor-decommissioning plan submitted to Japan's nuclear watchdog under new regulations established after the Fukushima nuclear disaster. One new guideline sets the life span of a nuclear reactor at 40 years, in principle.
Kyushu Electric plans to start decommissioning the No. 1 reactor of the Genkai plant next fiscal year, which starts in April. The total cost of the four-stage project is estimated at 36.4 billion yen ($300 million).
The decommissioning work is expected to generate about 3,000 tons of radioactive waste, but the disposal sites have not been picked.
The Genkai No. 1 reactor began operating in 1975. Kyushu Electric decided to decommission the reactor in March.

January 2, 2016

Robot to be used to capture images of fuel in reactors

TEPCO to tackle removal of molten nuclear fuel

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

The operator of the crippled Fukushima Daiichi nuclear power plant is expected to take on the challenge of removing the molten fuel from reactors that suffered meltdowns in 2011.

Soon it will be nearly five years since the massive earthquake and tsunami triggered a nuclear accident at the plant.

Workers have not been able to determine the extent of damage or find the molten fuel at the No.1, 2 and 3 reactors. Experts believe some of the fuel penetrated the reactor cores and is sitting at the bottom of the respective containment vessels.

TEPCO officials will bring in a remote-controlled robot that can withstand extremely high radiation levels to capture images of the fuel at the No. 2 reactor as early as next month. A similar undertaking is to take place at the No. 1 reactor.

The officials will then decide ways to remove the fuel. Filling the reactor containment vessels with water before extracting it is one option to shield workers from the intense radiation.

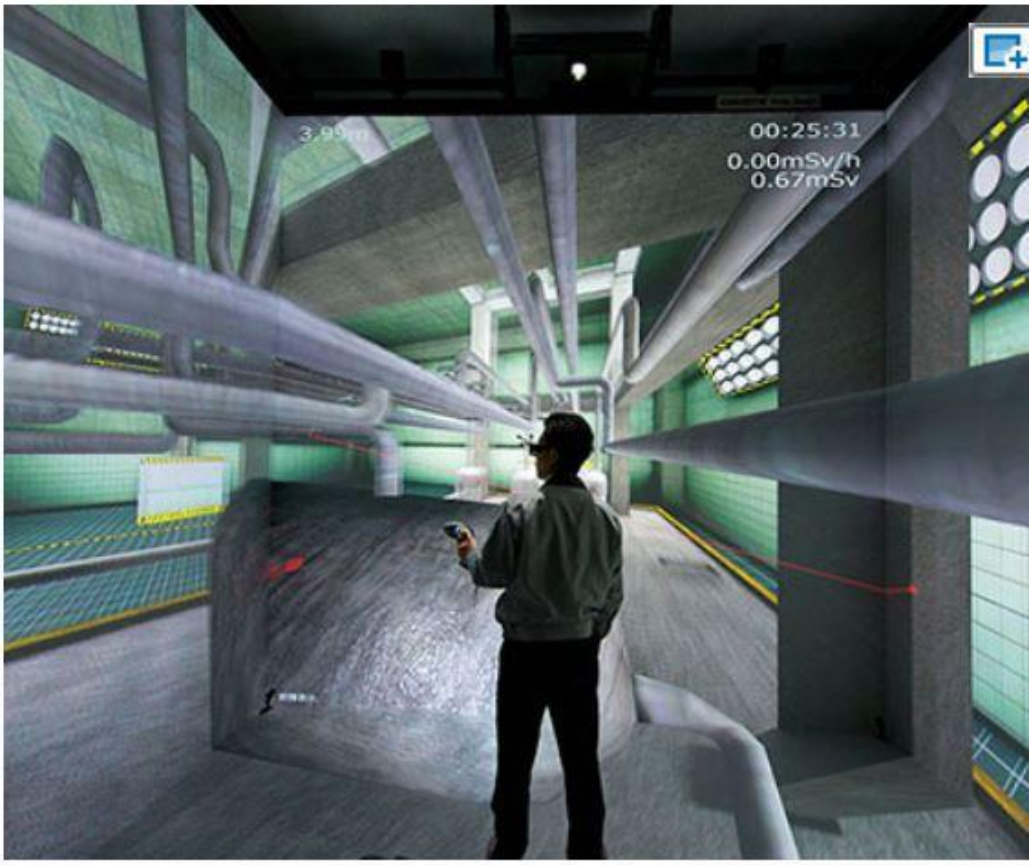
TEPCO's Chief Decommissioning Officer Naohiro Masuda says removing the fuel is their final goal. He added that **finding its whereabouts would be a big step toward decommissioning the plant.**

January 8, 2016

Virtual reality system to dismantle Fukushima Daiichi

Virtual reality to be used to help decommission Fukushima plant

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201601080058



A worker views a simulated 3-D virtual reality image of the interior of a reactor building at the embattled Fukushima No. 1 nuclear power plant at a research and training center in Naraha, Fukushima Prefecture. (Takuya Isayama)

By TAKUYA ISAYAMA/ Staff Writer
NARAHA, Fukushima Prefecture--A virtual reality system here that will assist in the decommissioning of the crippled Fukushima No. 1 nuclear power plant is preparing for full-scale operations this spring.
Located at the Naraha Remote Technology Development Center, the system features a 3.6-meter-high display that simulates 3-D images of the interiors of the reactor buildings at the Fukushima plant.
The research and training center was developed by the Japan Atomic Energy Agency as part of efforts for the lengthy decommissioning process, which is expected to take 30 to 40 years.
By using dedicated virtual reality goggles, researchers can view simulated 3-D images of the interiors of reactor buildings that are currently inaccessible to humans because of dangerous levels of radiation.
The display shows estimated dose of radiation levels in millisieverts during planned work at the site in the upper part of the image.
The center also features a model of a reactor containment vessel to be used for training in decommissioning methods.

January 18, 2016

Two new Toshiba devices for No.3

Devices to retrieve nuclear fuel shown to media

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Electronics maker Toshiba has shown media a pair of new devices to be used in retrieving nuclear fuel rods from one of the reactors at the damaged Fukushima Dai-Ichi nuclear power plant.

The 2 devices were unveiled at a Toshiba factory in Yokohama, near Tokyo, on Monday.

They will be used to remove rubble and extract fuel from a storage pool at the plant's Number 3 reactor building.

When the nuclear accident occurred in March 2011, fuel rods were being held in pools on the top floors of the Number 1 to Number 4 reactor buildings.

Workers have cleared the pool at the Number 4 building. But fuel rods remain in the 3 other buildings as workers cannot enter due to high levels of radiation.
The device to clear out rubble is about one meter wide and has 2 arms to hold or cut debris. It is suspended with 6 wires to enable small location adjustments.

After rubble is removed, the other device will be used to retrieve 566 units of fuel in the Number 3 reactor building pool.

The plant operator, Tokyo Electric Power Company, aims to bring the devices to the reactor building in the next fiscal year, have workers trained and start work in 2018.

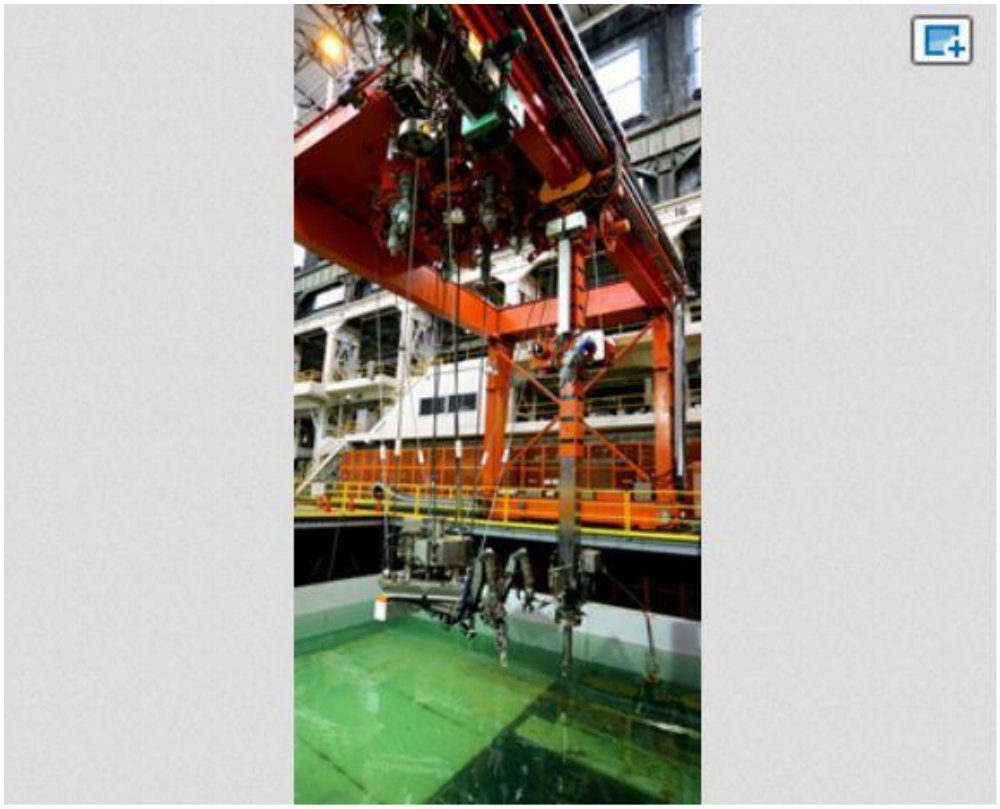
The leader of the team that developed the devices, Koichi Sekiguchi, says little is known about the situation inside the pool.

He says the team will develop new tools if the devices are not enough to make sure that workers can carry out their mission safely.

January 19, 2016

Toshiba shows off remote-control gear to be used to extract nuclear fuel at Fukushima plant

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201601190049



Remote-control equipment developed by Toshiba Corp. to remove spent nuclear fuel from a storage pool in a demonstration held on Jan. 18 at the company's Keihin plant in Yokohama (Tatsuya Shimada)

By HIROMI KUMAI/ Staff Writer

Toshiba Corp. gave a demonstration Jan. 18 of a remote-control crane and robot that it expects to play a crucial role in decommissioning work at the stricken Fukushima No. 1 nuclear power plant.

Because of the high radiation levels at the plant site, remote-control robots and other devices are the only means of removing nuclear fuel from the plant's damaged reactors.

Toshiba said its equipment will be used at the No. 3 reactor, which went into a meltdown and was heavily damaged after the 2011 Great East Japan Earthquake and tsunami.

Toshiba put its new crane and robot through their paces at its Keihin plant in Yokohama.

The crane was demonstrated to show how it can lift out nuclear fuel assemblies from the reactor's storage pool.

The robot showed how it can remove rubble that covers the fuel and collect the fuel assemblies. The robot's two extending arms latched onto rubble and placed it in a cart. It also showed how it can cut and remove cables that are obstacles in the damaged reactor building.

Twenty-two cameras are attached to the two pieces of remote-control equipment, and video images will be monitored in a room away from the reactor site. Operators will be able to use the images to control the equipment via a computer mouse and other controller devices after confirming the location of the remote-control equipment inside the No. 3 reactor building.

According to officials of Tokyo Electric Power Co., the operator of the Fukushima No. 1 plant, the equipment will be installed at the plant as early as this spring.

After training on-site, the removal of the spent nuclear fuel will get under way in fiscal 2017. Plans call for removing the remaining 566 fuel assemblies from the storage pool over a two-year period.

January 26, 2015

Robot probe in No.1 containment vessel postponed

Reactor robot faces postponement

http://www3.nhk.or.jp/nhkworld/english/news/20160126_17.html

The operator of the Fukushima Daiichi nuclear plant is facing another obstacle as the firm tries to remove melted fuel from the crippled reactors. It's decided to postpone sending a robotic probe into one of the reactors after assessing the conditions as too severe.

Tokyo Electric Power Company, or TEPCO, was planning to send the probe into the flooded base of the No.1 reactor's containment vessel by the end of March.

During the accident in 2011, most of the fuel melted through the core. The debris is thought to be accumulating in heavily contaminated water at the bottom of the vessel.

A robot TEPCO sent in last April failed to locate the fuel.

The newer robot can move in water. But an endoscopic inspection has revealed heavy clouding by rust and other elements. Officials say that the robot won't be able to function in those conditions.

The government and TEPCO now plan to postpone the probe by about a year to consider their options. One is to position the robot above the pool and take readings from there.

TEPCO also plans to send robots inside the No.2 and No.3 reactors, but they're yet to set a schedule.

Removing the melted fuel is considered the toughest part of the decades' long decommissioning process. Under the current timetable, the utility will have a broad outline drawn up of the fuel removal work by around June 2017.

Toaki mayor OKs permanent disposal site

Tokai mayor accepts nuclear waste disposal plan

http://www3.nhk.or.jp/nhkworld/english/news/20160126_33.html

The mayor of the village hosting a closed nuclear plant near Tokyo has told NHK that he will approve a plan to bury some low-level radioactive waste at the facility.

In 2001, the operator, Japan Atomic Power Company, began the process of scrapping the Tokai plant in Ibaraki Prefecture. The first commercial nuclear plant in Japan had been closed in 1998.

In July last year, the operator revealed a plan to permanently dispose of more than 12,000 tons of low-level radioactive waste by burying it at the facility.

The waste includes concrete chunks and metal parts from demolished buildings, and is classified under the lowest of the 3 categories of nuclear waste.

Tokai Mayor Osamu Yamada said the decommissioning process should not be delayed because local authorities will not accept permanent disposal sites. He added that he feels the plan's approval is inevitable, as there is no other choice.

The burying of the waste will start after the plan passes the Nuclear Regulation Authority's screening, and obtains official approval from Ibaraki Prefecture and Tokai Village.

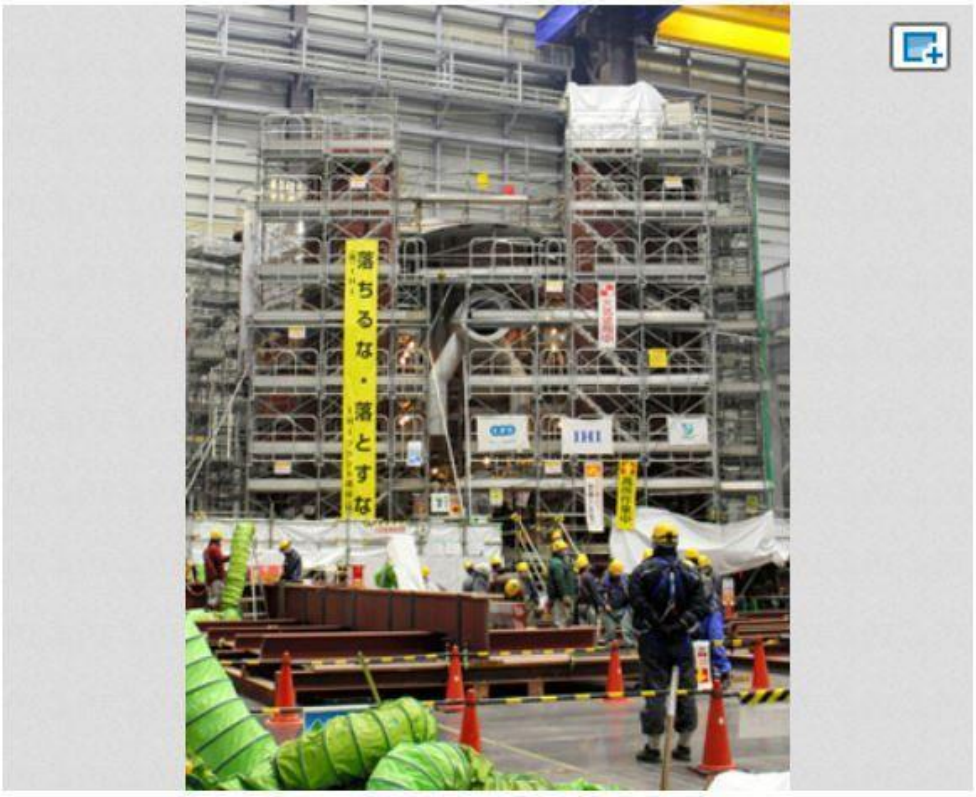
If the plan is implemented, Tokai Village would become the first municipality in Japan to host a permanent disposal site for contaminated waste.

January 27, 2016

Nahara center builds model of part of No.1 containment vessel

Nuclear reactor mockup to be used to advance decommissioning technology

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201601270040



This life-size model of the lower part of a reactor containment vessel at the Fukushima No.1 nuclear power plant is nearing completion in Naraha, Fukushima Prefecture. (Hisashi Hattori)

NARAHA, Fukushima Prefecture--A life-size model of a section of the crippled Fukushima No. 1 nuclear power plant that will be used in developing decommissioning technology is almost complete.
The mockup of the lower part of a reactor containment vessel will be used to develop remote-control technology used to locate the section from where radioactive water is leaking in order to repair damage, the Japan Atomic Energy Agency said.

A group of reporters from the Japan National Press Club were allowed to enter the test building of the JAEA's Naraha Remote Technology Development Center in the town of Naraha.
The model is being built at the center by a consortium comprised of electric utilities and nuclear plant manufacturers. It is scheduled to be completed in mid-March.
Radiation levels near the reactors that went in meltdown in the aftermath of the 2011 earthquake and tsunami disaster remain too high for workers to approach. The development of remote-control technology is key to smoothly conducting the decommissioning work, which is estimated to take 30 to 40 years.
The Naraha center also houses a massive screen on which a 3-D image of the interior of a reactor building can be viewed by wearing special eyeglasses.

January 29, 2016

Poor visibility: Robot inspections delayed

TEPCO delays robotic surveys at Fukushima nuclear reactors

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201601290050

By HIROMI KUMAI/ Staff Writer
Tokyo Electric Power Co. has postponed inspections by robots to finally confirm the location and state of melted fuel at two damaged reactors of the Fukushima No. 1 nuclear plant.
The camera-equipped robots were scheduled to enter the containment vessels of the No. 1 and No. 2 reactors within fiscal 2015, which ends in March. But TEPCO said Jan. 28 that a series of unexpected circumstances, such as poor visibility caused by murky radioactive water, have ruined that plan.
The robot for the No. 1 containment vessel will be redesigned, and the remote-controlled survey will be conducted in fiscal 2016, the utility said, without offering a more specific timetable.
Nuclear fuel assemblies in the No. 1 to No. 3 reactors are believed to have melted and fallen to the bottom of the containment vessels following the March 2011 earthquake and tsunami.
Radiation levels inside the containment vessels remain extremely high, making them too dangerous to be approached by workers.
The remote-controlled robotic probe was seen as crucial in determining conditions inside the containment vessels for the eventual decommissioning of the nuclear plant.
TEPCO conducted a preliminary survey using an industrial endoscope in the containment vessel of the No. 1 reactor. It found accumulated waste turned the water murky and blocked the view.
For the No. 2 reactor, TEPCO had planned to locate the melted nuclear fuel using a robot last summer. But decontamination and cleanup work near the entrance to the containment vessel proved difficult. That prevented TEPCO from carrying out robotic survey as planned.

February 3, 2016

Decommissioning approved but what to do with the waste?

Nuclear operator gets approval for demolition plan

http://www3.nhk.or.jp/nhkworld/english/news/20160203_29.html

Japan's government has given approval for the operator of a nuclear plant in central Japan to decommission equipment around 2 of its reactors.

Chubu Electric Power Company got the approval for the 2nd phase of its decommissioning plan from the Nuclear Regulation Authority on Wednesday.

The firm started work on the reactors at the **Hamaoka plant** in Shizuoka Prefecture 7 years ago, with the aim of completely decommissioning them by fiscal 2036.

The operator plans to dismantle the equipment, such as turbines and pipes for radioactive steam, by fiscal 2022 and decontaminate pressure vessels.

It estimates that the phase will yield about 5,000 tons of low-level radioactive waste, but has no dependable plan for where to dispose of it. The utility plans to tentatively keep some of the waste in buildings at the plant.

The operator says it will work with other firms in the country's power industry and take into account government policy in finding disposal sites.

February 10, 2016

Only "the first stage of a mountain"

Nuclear plant head says another disaster would not threaten cleanup

http://www.japantimes.co.jp/news/2016/02/10/national/fukushima-nuclear-plant-head-says-another-disaster-would-not-threaten-cleanup/#.Vrtk3VKDmot

A worker wearing a protective suit and mask is seen from a bus transporting journalists during a media tour near the No. 3 reactor building at Tokyo Electric Power Co's tsunami-crippled Fukushima No. 1 nuclear power plant in Fukushima Prefecture on Wednesday. | AFP-JIJI/POOL

AFP-JIJI
The chief of Japan's shuttered Fukushima nuclear power plant warned Wednesday that the biggest risk the crippled facility faces is another major earthquake and tsunami — though he insisted the chaos of nearly five years ago would not be repeated.
On March 11, 2011, a magnitude 9.0 undersea earthquake off the northeastern coast of Honshu sparked a massive tsunami that swamped cooling systems and triggered reactor meltdowns at the Fukushima No. 1 plant, run by operator Tokyo Electric Power Co.
Radiation spread over a wide area and forced tens of thousands of people from their homes — many of whom will likely never return — in the worst nuclear disaster since Chernobyl in 1986.
Now with the fifth anniversary of the disaster approaching next month, Tepco opened up the facility to journalists on Wednesday to provide an update on the cleanup process, which is expected to take decades.
"If a major earthquake hits and then a tsunami comes again, that would be the most tense moment for us," Akira Ono, head of the plant, told reporters when asked what would be the greatest risk to the plant.
Tepco has been blamed for a delay in securing power to cool fuel in the reactors that triggered meltdowns and subsequent hydrogen explosions that spewed radiation over the area and forced residents to flee.
"But we will not fall into confusion like before," Ono said, explaining that **energy levels at the plant are much lower than those after the accident, while the company has carried out disaster drills to prepare.**
He also said **the firm had built temporary coastal barriers that can block waves of up to 15 meters, matching levels of the 2011 tsunami.**
Some 8,000 workers, ranging from nuclear experts to civil engineers, are still battling daily to control the reactors that melted down, as their decommissioning process is still in the initial stage.
Some progress has been made as massive wreckage, including overturned vehicles, was removed and workers are no longer required to wear full-face masks in many areas of the site.
In a newly built rest station inside the facility, workers can have hot meals and check their radiation exposure levels through state-of-the-art whole-body counters.
But the scar of the catastrophe is still visible in other areas as steel frames gnarled by the hydrogen explosions can be seen at the plant's No. 3 reactor, where radiation levels are still extremely high.
About 1,000 huge tanks for storing contaminated cooling water occupy large parts of the site some 230 km northeast of Tokyo.
And more tanks will be needed as massive amounts of groundwater flows into the reactors each day and mixes with the cooling water.
Ono, the plant chief, says the reactors are now stable but need to be kept cool to prevent them running out of control again.
Tepco estimates that it is likely to take up to four decades to completely clean up the site, but some experts warn the unprecedented decommissioning may be delayed further.
"I feel like we have just climbed over the first stage of a mountain," Ono said, using a colloquial Japanese expression meaning that only 10 percent of the journey is finished.

Decommissioning: Local businesses preferred

Deal to protect jobs in scrapping nuclear reactors

http://www3.nhk.or.jp/nhkworld/english/news/20160210_22.html

Regional officials in Japan are taking steps to ensure that work to decommission nuclear reactors in their prefecture go to local businesses.

Three reactors in Fukui Prefecture will be scrapped. They are, the No. 1 reactor at the Tsuruga nuclear power plant, and the No. 1 and No. 2 reactors at the Mihama plant.

The prefectural government expects to sign a deal with the plant operators Japan Atomic Power and Kansai Electric Power as early as Wednesday.

The agreement provides that local residents and businesses be considered for the decommissioning work.

It requires plant operators to take responsibility for safety issues concerning the management of nuclear waste and its impact on the environment.

Fukui Prefecture is the first municipality hosting nuclear facilities to reach such a deal. Officials were concerned about the loss of jobs and business associated with scrapping the reactors.

The Japanese government now limits the operation of reactors to 40 years, in principle, following the 2011 accident at the Fukushima Daiichi nuclear power plant.

Testing incinerator to burn contaminated waste

TEPCO begins testing waste incinerator

http://www3.nhk.or.jp/nhkworld/english/news/20160210_17.html

The operator of the Fukushima Daiichi nuclear power plant is beginning tests of an incinerator that will burn contaminated waste produced in work to decommission the crippled reactors.

About 7,000 workers are engaged in the decommissioning effort each day.

As of the end of 2015, about 66,000 cubic meters of waste had accumulated at the plant. That's enough to fill **more than 100 25-meter swimming pools**. The waste includes protective suits, metal sheets, and lumber.

Tokyo Electric Power Company has built an incinerator to burn the waste, and will begin testing it on Wednesday.

The incinerator is designed to reduce the volume of waste by about 90 percent.

TEPCO officials say it can operate around the clock and dispose about 14 tons of waste per day.

Experts say the ash that results will have a higher concentration of radioactive materials than the original waste.

TEPCO says it will store the ash in drums inside a radiation-proof building. The utility also says it will install filters on the incinerator's exhaust ducts to prevent the release of radioactive substances.

The test run will continue until February 18th. TEPCO says it will then check radioactivity levels in the exhaust fumes and hopes to launch full-scale operations by the end of March.

February 11, 2016

Three reactors to be scrapped

[title is missing] http://www.japantimes.co.jp/news/2016/02/11/national/kansai-electric-japan-atomic-power-move-plans-scrap-three-reactors/#.VrxnNlKDmot

JIJI
Kansai Electric Power Co. and Japan Atomic Power Co. will submit applications to the Nuclear Regulation Authority as early as Friday seeking approval for plans to scrap aging nuclear reactors in western Japan, it was learned Thursday.
The timetables for the **No. 1 and No. 2 reactors of Kansai Electric's Mihama plant** and for the **No. 1 reactor of Japan Atomic Power's Tsuruga plant** will outline the facilities and equipment to be dismantled and the length of time it will take to complete the work.
The dismantling operations are expected to take around 30 years for the Mihama No. 1 and No. 2 reactors and about 25 years for the Tsuruga No. 1 reactor, informed sources said. The three reactors, **all in Fukui Prefecture**, were decommissioned in April last year.
On Wednesday, **Kansai Electric and Japan Atomic Power concluded agreements with the Fukui Prefectural Government and the governments of the host municipalities** — the town of Mihama and city of Tsuruga. The agreements, which include regional revitalization measures, are the first of their kind in Japan.
Along with the three reactors, the No. 1 reactor at Kyushu Electric Power Co.'s Genkai plant in Saga Prefecture and the No. 1 reactor at Chugoku Electric Power Co.'s Shimane plant in Shimane Prefecture were decommissioned in April last year.
Kyushu Electric filed an application in December for NRA approval of its schedule to scrap the Genkai No. 1 reactor.

February 16, 2016

2.6 billion dollars to decommission Monju

Scrapping prototype reactor could cost $2.6 bil.

http://www3.nhk.or.jp/nhkworld/english/news/nuclear.html

Japan's science ministry has revealed that it could cost an estimated 2.6 billion dollars to decommission the troubled Monju fast-breeder nuclear reactor.

The Japan Atomic Energy Agency made the estimates for the prototype reactor in 2012, one year after

the Fukushima nuclear accident. The reactor is located at a plant in Fukui Prefecture, central Japan.

This is the first time the decommissioning costs have emerged.

Dismantling the reactor was estimated to take about 1.1 billion dollars. That's double to triple the cost of dismantling a regular reactor.

Maintenance and management was set at 1.3 billion dollars, while removing spent nuclear fuel was projected to cost about 200 million dollars.

The estimates did not include costs of transporting nuclear fuel and removing sodium used to cool the reactor.

The agency officials say they made the estimates due to debate at the time on whether to continue Monju's development. They say Monju is larger than conventional reactors, so the decommissioning cost is greater.

A panel of Japan's science ministry is in discussions to find a new operator for Monju after a series of safety problems were found at the plant.

Decommissioning of troubled fast-breeder reactor Monju would cost 300 billion yen

http://mainichi.jp/english/articles/20160216/p2a/00m/0na/005000c

The operator of Monju, a trouble-prone prototype fast-breeder nuclear reactor in Tsuruga, Fukui Prefecture, estimates that it would take at least 300 billion yen to decommission the reactor, the Mainichi Shimbun learned Feb. 15.
This is the first time that Monju's decommissioning cost -- which is several times the cost of decommissioning regular nuclear reactors -- has come to light.
The Nuclear Regulation Authority (NRA) has sought replacement of the reactor's operating body, the Japan Atomic Energy Agency (JAEA).
Over 1 trillion yen has been pumped into the Monju reactor thus far, and even if it were reactivated, repairs and other maintenance costs would surpass another 100 billion yen. As such, massive costs would be required to either decommission or reactivate the reactor.
The estimate was made in 2012. If decommissioning of Monju were to undergo the same procedures as the prototype nuclear test reactor Fugen, also in Tsuruga, it would take approximately 30 years and cost some 130 billion yen to dismantle the facility. It would cost an additional 20 billion yen to remove spent nuclear fuel, and some 150 billion yen for maintenance and management costs, such as electricity and labor. Estimated costs for the removal of spent nuclear fuel include temporary storage, but because no storage site has been decided, the cost of transporting spent fuel to such a site has not been included.
In the case of ordinary nuclear reactors, such as the No. 1 and No. 2 reactors at Chubu Electric Power Co.'s Hamaoka nuclear plant in Shizuoka Prefecture, the cost of decommissioning both is expected to cost around 84 billion yen, while decommissioning both the No. 1 and No. 2 reactors at Kansai Electric Power Co.'s Mihama nuclear plant in Fukui Prefecture is estimated to cost around 68 billion yen.
Because Monju is sodium-cooled, decommissioning costs are relatively higher than regular, water-cooled nuclear reactors. Furthermore, because the decommissioning technology for sodium-cooled

reactors has yet to be established, funds for further research and development will also be needed. In response to numerous maintenance errors pointed out with the Monju reactor, the NRA advised the Ministry of Education, Culture, Sports, Science and Technology last November to propose an alternative operator to the JAEA. The NRA also demanded that if the ministry is unable to do so by around this coming summer, a fundamental review of Monju be conducted. The ministry set up a panel of experts late last year to consider a new operator for the troubled reactor.

March 7, 2016

But who is going to do the work?

5 years after disaster, reactor decommissioning faces troubling shortage of workers

http://mainichi.jp/english/articles/20160307/p2a/00m/0na/020000c

A total of 21 companies involved with the decommissioning of reactors at the Fukushima No. 1 Nuclear Power Plant -- half of the firms that responded to a survey conducted by the Mainichi Shimbun -- revealed that they are facing concerns due to an insufficient number of employees for the work.
The risk of radiation exposure from the decommissioning work means that the companies are having trouble attracting young people, with the ongoing aging of the population pointing toward a possible hollowing-out with respect to the technical abilities of the workforce in this regard. This could mean that the problem of securing workers will become an ongoing problem that would result in a delay of reactor decommissioning -- which could in turn hinder local reconstruction efforts.
At the administrative building located at the nuclear plant's point of entrance and exit, workers are routinely met with a greeting of "Please be safe" as they come and go in order to encourage them to fulfill their tasks without any incidents occurring.
While the plant was known immediately after the nuclear accident as a disaster zone, now -- five years later -- a sense of calm has been restored. The radiation exposure risks and the aging of employees, however, have meant that problems continue to plague the workplace environment.
The survey was sent to a total of 246 companies connected to the reactor decommissioning work, including prime contractors, as well as additional firms whose names were included in construction work-related approval and licensing documents that were submitted to Fukushima Prefecture and other local government offices. Responses were received from 42 companies, or around 20 percent of the total number contacted.
Asked whether they had a sufficient number of employees, 21 firms responded either "No, we have an insufficient number of employees," or "Basically speaking, we have an insufficient number of employees" -- a figure eclipsing the 20 firms that responded, "We have a sufficient number of employees," or "Basically speaking, we have a sufficient number of employees."
Asked to name the reasons for the insufficiency (with multiple responses allowed), the answer with the highest number of responses was "Numerous employees are leaving the company due to retirement, and young people are not coming (to take their place)," at 10 firms. The second- and third-highest answers, respectively, were "it's difficult to pass down the (required) technical skills," at seven firms; and "the number of aspiring employees is decreasing due to the high radiation levels," at six firms.
"Although people respond when we announce job openings, they do not have the necessary qualifications -- such as being able to hoist and lower suspended loads," commented the 52-year-old president of a construction firm in the Fukushima prefectural city of Iwaki that is contracted by the nuclear plant for reactor decommissioning-related work.

The firm in question is mostly contracted for on-site work where radiation levels are high. When the government-set figures of 50 millisieverts per year and 100 millisieverts per every five years are exceeded, on-site work is not permitted -- and the company must therefore compensate by hiring extra employees.
Because qualified individuals are not available, however, the firm contracts with another company -- resulting in a situation whereby its labor insufficiency is filled by hiring the other firm's employees as its own. This practice, which is known as fake subcontracting, runs the risk of infringing the Worker Dispatch Law and other regulations.
"We are aware that this is illegal," the company president notes, "but everyone still does it."
According to a worker survey conducted by the Tokyo Electric Power Co. (TEPCO), which operates the Fukushima No. 1 Nuclear Power Plant, some 20 percent of all workers at the plant had been hired via fake subcontracting. And while TEPCO asks its business affiliates to comply with the law, it does not appear that this is a situation that is set to improve.
"With reactor decommissioning set to be entering its most crucial stage, the national government should be taking the initiative to put measures in place that are aimed at securing workers for this purpose," points out Kazumitsu Nawata, a professor of econometrics at the University of Tokyo who is well-versed in the situation facing the nuclear plant workers.
In assessing the future prospects for the reactor decommissioning work, which is likely to go on for several decades, a matter exists beyond that of securing new laborers that is an additional cause for concern: the problem of workers' exposure to radiation.
The estimated average monthly radiation exposure of workers was 32 millisieverts immediately following the nuclear accident, and has presently decreased to 0.44 millisieverts. No longer is there a need to wear full-face masks, which made breathing difficult.
Between the disaster and January 2016, however, the number of workers whose yearly radiation exposure level was greater than 5 millisieverts -- a figure that the Ministry of Health, Labor and Welfare utilizes as a criteria when determining the recognition of workers' compensation in cases of leukemia -- was around 20,000 among the total of 42,000 workers.
When irradiated fuel from the spent nuclear fuel pools begins to be transported, moreover, there is a possibility that the dosage in this regard will increase even further.
A 23-year-old male worker from the city of Iwaki who was responsible for removing radioactively-contaminated vehicles that had been left on the premises of the nuclear plant said that he was surprised when the figures on his dosimeter began increasing immediately.
"I do not know what effects (this work) will have upon my body in 30 years," he commented. "I do not want to do work involving high doses (of radiation)."
Also troubling are the effects of the withdrawal of seasoned workers from the field. According to TEPCO, veteran employees in their 50s or older comprise 45 percent of all total workers. With reactor decommissioning work -- including the collection of melted nuclear fuel -- expected to enter its main phase in 2021, it is possible that the continuing loss of experienced workers will lead to a situation characterized by a reduction in both human resources and technology.
"I will never again return to 1F (the Fukushima No. 1 Nuclear Power Plant)," asserted Yuji Takagi, 53, a former nuclear plant worker from the city of Iwaki.
Takagi, a veteran employee since the time prior to the nuclear disaster whose work included helping to measure the number of neutrons directly underneath the nuclear reactors, explained that with the sudden increase in the number of tank and other construction projects taking place following the accident, there was also a rising number of employees who were inexperienced with working at nuclear power plants.
As a result, Takagi felt like there was a mismatch wherein he was unable to utilize his job experience.
"If you do not understand the inner structure of nuclear plants, there will be problems with reactor decommissioning," he commented, adding, "Know-how is indispensable."
The system is comprised of a pyramid-like structure, whereby TEPCO and major general contractors -- which serve as the original contractors at its peak -- contract out work to the other companies that are

fanned out beneath them. With work consequently compartmentalized, then, it accordingly becomes increasingly difficult to utilize employees' expertise.
"The structure of subcontracting results in decreasing profits for lower-level companies, who are additionally burdened with taking up the slack (of companies further up on the pyramid)," commented Professor Nawata. "A mechanism is necessary to improve this treatment."
Also involved with the reactor decommissioning work are numerous local residents of Fukushima Prefecture who are themselves victims of the disaster.
A 51-year-old worker from Futaba County who is responsible for analyzing contaminated water at TEPCO-owned facilities on the premises of the plant commented, "My work plays only a small part, but analysis of the contaminated water is an indispensable part of the reactor decommissioning process."
The worker added, "I am happy to be of service to Fukushima Prefecture, as well as to the next generation."
The feared scarcity of workers, then, has also resulted in a situation of dependence upon Fukushima workers to fill this employment need that exists within the reactor decommissioning sector.

March 11, 2015

A long road to decommissioning

Rows of massive tanks storing radiation contaminated water line at the Fukushima No. 1 nuclear power plant in February. (Satoru Semba)

FIVE YEARS AFTER: Tougher work awaits TEPCO at Fukushima after water issue ends

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201603110047

OKUMA, Fukushima Prefecture--The ever-increasing rows of tanks storing radioactive water continue to eat up the precious available land at the Fukushima No. 1 nuclear power plant.
Five years after the Great East Japan Earthquake and tsunami on March 11, 2011, triggered the triple meltdown at the plant, Tokyo Electric Power Co. is still struggling to bring the contaminated water problem under control.
And the utility has yet to fully tackle the more difficult and time-consuming task of actually decommissioning the ruined nuclear plant.
Each day, TEPCO circulates 300 tons of water inside the No. 1 to No. 3 reactors to cool down the melted nuclear fuel within.
In addition, groundwater keeps flowing into the damaged reactor buildings and inevitably becomes highly contaminated by the radiation.
TEPCO reuses some of this contaminated water to cool down the damaged reactors.
The rest of the water is processed through the ALPS (advanced liquid processing system) multi-nuclide removal system and other equipment to remove highly radioactive substances. The water is then stored in tanks.
The advanced decontamination equipment has helped TEPCO to reduce the amount of highly contaminated water at the plant's compound.
But 400 to 500 tons of less contaminated water still accumulates at the plant site on a daily basis.
To reduce the amount of groundwater flowing into the reactor buildings, TEPCO initiated its "subdrain plan" in September to pump groundwater from wells dug around the reactors' premises and release the water into the ocean after the decontamination process.
On the seaside of the reactor buildings, the utility constructed underground walls to prevent contaminated groundwater from flowing into the sea.
Also around the reactor buildings, TEPCO installed coolant pipes to create an underground frozen soil wall, which is expected to divert the clean groundwater directly to the ocean.
But this is only a stop-gap measure at best.
The number of storage tanks, which are built at the site, has reached 1,000. Rows of tanks cover most of the parking lots, green spaces and vacant areas at the Fukushima plant site. Eventually, space will run out for storing the contaminated water.
The government will start full-fledged discussions on measures to reduce the amount of less contaminated water at the plant in fiscal 2016, which starts in April.

LONG ROAD TO DECOMMISSIONING

Five years after the onset of the nuclear disaster, TEPCO has taken the first step in its decommissioning road map.
The first major challenge in decommissioning the plant is removing spent fuel from storage pools in the upper parts of the reactor buildings.
TEPCO has already removed 1,535 fuel assemblies from the No. 4 reactor, which was offline for a periodic safety check when the tsunami slammed into the plant.
However, a large amount of debris and the high radiation levels have delayed the removal of spent fuel from the No. 1 to No. 3 reactor buildings.
Work is under way to remove debris from the upper part of the No. 3 reactor building. TEPCO plans to start removing the spent fuel in fiscal 2017.
According to TEPCO's road map, the removal of spent fuel from the No. 1 and No. 2 reactor buildings will start in fiscal 2020. But the utility has not started taking debris out of the upper part of the buildings where the fuel storage pools are located.
The toughest task will be removing the melted fuel inside the No. 1 to 3 reactor containment vessels.
The locations and amount of melted fuel inside the reactors remain largely unknown. Extremely high radiation levels in the reactor containment vessels have prevented workers from analyzing the conditions. Even remote-controlled survey robots have failed to readily approach the core areas.

The preferred way to remove the melted fuel is the “water-covered method.” It involves pumping in water to fill the reactor containment vessels to the upper part and removing the fuel while the water keeps radiation exposure of the workers at low levels.
The government and TEPCO are also considering the “airborne method” if contaminated water keeps leaking from the containment vessels. Under this method, water would fill only the bottom part of the containment vessels, and the melted fuel would be removed through the air.
The two parties also need to develop special equipment to remove the melted fuel and keep it safely stored in containers.
They estimate the decommissioning process will take 30 to 40 years. But they have not specified the conditions that can finally bring an end to the nuclear disaster.

NRA should help relieve residents' worries

NRA chairman urges caution in plant decommissioning amid residents’ radiation fears

http://www.japantimes.co.jp/news/2016/03/11/national/nra-chief-urges-careful-decommissioning-plant-ease-minds-nearby-residents/#.VuK9euaDmot

by Kazuaki Nagata
Staff Writer
As five years have now passed since the Fukushima No. 1 nuclear power plant meltdowns began, the chairman of the Nuclear Regulation Authority on Friday stressed that regulators must firmly monitor the decommissioning of the crippled plant to ease concerns of residents affected by the event.
Addressing hundreds of fellow regulators, NRA Chairman Shunichi Tanaka said towns near the Fukushima plant are still struggling to revive their communities and former residents are constantly worried about radiation levels.
“There are many things that we can do to help them,” Tanaka said.
“First, we need to direct our utmost efforts to the decommissioning of the Fukushima No. 1 plant, so that it won’t be a cause of concern” for Fukushima residents, he said.
The NRA has been tasked with overseeing the decommissioning of the plant, which is being carried out by operator Tokyo Electric Power Co.
Tanaka also said regulators can help by providing more efficient decontamination plans and maps to show radiation levels near the plant.
While evacuation orders have been lifted for some areas close to the plant, nearly 100,000 people are living in limbo after being evacuated.
The NRA chairman mentioned that some evacuees from the town of Tomioka plan to return home to see the cherry blossoms this year.
However, they will only be able to see the sakura blossoms and get glimpses of their hometown from the inside of a bus because they are worried about radiation exposure.
“I think we share the feeling that we want them to be able to see the cherry blossoms, but not from inside a bus,” he said. “What can we do to realize that? What can we do to prevent more people from seeing such a sad scene? I want you to think about it again by taking this opportunity on March 11,” said Tanaka, who has headed the NRA since its inception in 2012.
The NRA was born of lessons learned from the Fukushima meltdowns — the world’s worst nuclear disaster since Chernobyl, Ukraine, in 1986.

Before the disaster, the regulatory body was under the wings of the Ministry of Economy, Trade and Industry, which actually promotes the use of nuclear energy, which is why it was strongly criticized, because its regulators lacked the necessary teeth to strictly regulate plant operators.
Now, the agency has been separated from the nuclear promotional body and boasts a considerable degree of independence from politicians.

March 14, 2016

2051

Removal Of Fukushima Fuel Debris Could Last Until 2051, Tepco Says

http://www.nucnet.org/all-the-news/2016/03/14/removal-of-spent-fuel-debris-could-last-until-2051-tepco-says

Work on the removal of melted fuel (corium) debris from the damaged reactors at the Fukushima-Daiichi nuclear site could last up to 2051 according to "initial calculations", owner and operator Tokyo Electric Power Corporation (Tepco), told NucNet.
No final decision has been taken on a completion date for decommissioning work at Fukushima-Daiichi, but initial estimates show that clean-up activities could take between 30 and 40 years after the March 2011 accident, the utility said.

According to Tepco, there is corium debris in the reactor pressure vessels or containment vessels of Units 1, 2, and 3 at the station, which was severely damaged by an earthquake and resulting tsunami on 11 March 2011. Unit 4 was not loaded with fuel at the time.

Tepco said the most important tasks in the decommissioning process are the removal of fuel from the spent fuel pools in the reactor buildings and the removal of the melted and solidified fuel.

Tepco secured one trillion yen (€8bn, $8.8bn) for the first phase of decommissioning and recovery work at Fukushima-Daiichi from 2011 to 2013. In 2013, the company announced it had secured another one trillion yen, bringing the total existing budget to two trillion yen.

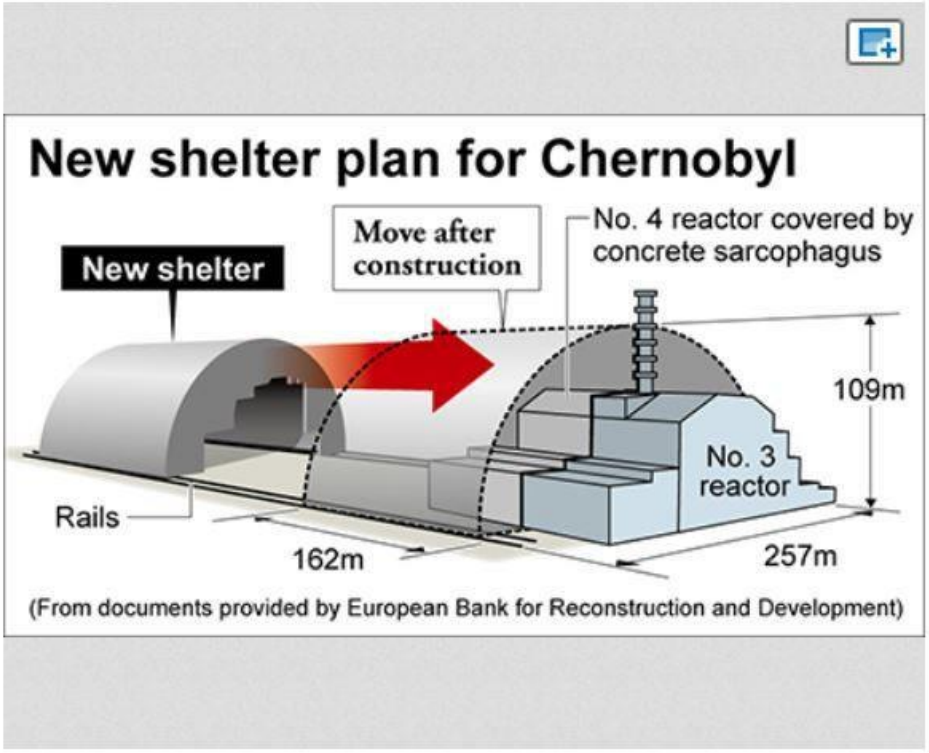
Public attitudes in Japan towards nuclear related issues like plant operation, final storage and disposal, and the eventual restart of nuclear power generation remain negative, Tepco said. A recent poll by local media showed that 30 percent were in support of nuclear restarts, while 53 percent were opposed and 17 percent undecided.

Asked about the possibility of restarting Tepco's two other nuclear power stations, Kashiwazaki Kariwa and Fukushima-Daini which were shut down following the 2011 accident, Tepco said it is still "not ready" to ask residents or stakeholders about possible restarts, but steps are being taken towards "initiating communication" with all stakeholders, the regulators and the government.

March 25, 2016

Chernobyl: 30 years and counting

The semicylindrical shelter to the left will eventually cover the No. 4 reactor that is now encased in a concrete sarcophagus. (Yasuhiro Sugimoto)



It's now 30 years and counting for Chernobyl clean-up effort

http://ajw.asahi.com/article/behind_news/social_affairs/AJ201603250049

By YU KOTSUBO/ Staff Writer

CHERNOBYL, Ukraine--The massive dome now being constructed at the stricken nuclear plant here shows the long time it takes to decommission reactors damaged in catastrophic accidents--30 years and still ongoing in this case.
The media was allowed into the plant's site March 23 under a program administered by the European Bank for Reconstruction and Development, which is funding the dome project.
The new shelter being constructed is needed because of the wear and tear on the concrete sarcophagus that now covers the No. 4 reactor, which exploded during the accident on April 26, 1986.
The new semicylindrical shelter will be moved, perhaps as early as the end of 2016, on rails to cover the sarcophagus to stop the further leak of radioactive materials.
Construction of the new shelter began in 2012. The vast steel structure will be 109 meters high, 257 meters wide and 162 meters long when finished. The total construction cost is estimated at 1.5 billion euros (200 billion yen, or $1.8 billion).
After the explosion at the No. 4 reactor almost 30 years ago, fires broke out and for 10 days radioactive material spewed out of the site. The radioactive level was six times higher than what was emitted from the Fukushima No. 1 nuclear power plant after the accident there five years ago in the wake of the Great East Japan Earthquake and tsunami.
The radiation level around the Chernobyl site is still so high that the area remains designated a no-entry zone.
The new shelter is designed to withstand earthquakes and tornadoes, and the plan is to have it enclose the stricken reactor for the next century.
However, no decision has been made on specific details for decommissioning the reactors, including how to dismantle the concrete sarcophagus. Concerns have also been raised about how to fund maintenance and administration of the site.

April 3, 2016

Until the contaminated water issue is solved...

Contaminated water, fuel extraction stand in way of decommissioning Fukushima plant

http://mainichi.jp/english/articles/20160403/p2a/00m/0na/010000c

With about five years having passed since the start of the Fukushima No. 1 Nuclear Power Plant disaster, nuclear workers still lack a method of treating the around 1,000 tanks of contaminated water stored on site, and the start of work to remove melted nuclear fuel from the plant remains at least five years away.
"Until the contaminated water issue is solved, decommissioning of the reactors remains far off. We have to stop the water," says Tetsuo Ito, professor of nuclear energy safety engineering at the Kinki University Atomic Energy Research Institute. Akira Ono, chief of the Fukushima plant, says, "We're still at step one" of the decommissioning process, which is estimated to take until 2041 to 2051.
Tokyo Electric Power Co. (TEPCO), the plant's owner, is treating the contaminated water with its Advanced Liquid Processing System (ALPS), which can remove 62 varieties of radioactive material. However, ALPS cannot remove radioactive tritium, and because of this the treated water is stored in tanks. Tritium is extremely difficult to separate from water, because even if one of the hydrogen atoms in a water molecule is replaced by tritium, the chemical properties such as the boiling point barely change.

The International Atomic Energy Agency (IAEA) has advised that tritium-containing water be released into the ocean, because its effect on the human body is very limited. Tritium-containing water is created even during the normal operation of a nuclear power plant, and it is released into the ocean in accordance with waste-disposal standards. However, there is local opposition to doing this at the Fukushima plant because of worries about its effects on the reputation of the local fishing industry, and no decision has been made on what to do with the water.
Tritium has a half-life of 12.3 years, so storing the water until the radiation naturally lessens is another option, but there is the risk of leaks during that time if the tanks' conditions deteriorate.
As for decommissioning the plant reactors, at the end of 2011 the national government put together a roadmap that estimated the decommission work would take 30 to 40 years. To decommission the No. 1 through 3 reactors at the plant, 1,573 units of spent fuel will have to be removed from the spent fuel pools of these reactors, and 1,496 units' worth of fuel that melted from the reactors will have to be removed. Safe removal of the melted fuel represents the largest problem.
The national government and TEPCO intend to decide on a plan for the fuel's extraction in the first half of fiscal 2018, and start extraction efforts at one of the reactors within the year 2021. Toyoshi Fuketa, a member of the Nuclear Regulation Authority (NRA), argues that nuclear fuel that is too difficult to take out should be stored on-site, saying, "There is the option of just removing as much (of the melted fuel) as possible, and hardening the rest (to seal off its radiation)."
The cost for decommissioning the reactors is already estimated at 2 trillion yen, and this could grow if the decommissioning schedule is delayed.
While the No. 1 through 3 reactors at the plant were shut down at the time of the Great East Japan Earthquake on March 11, 2011, they lost all power due to the proceeding tsunami and, with no way to cool the nuclear reactors, they experienced a meltdown. The tsunami measured at up to 15.5 meters, and emergency underground power supplies were flooded and failed to function.
The No. 1 reactor was equipped with a cooling system called Reactor Core Isolation Cooling (IC), but this didn't activate, and on March 12 at 3:36 p.m. the No. 1 reactor suffered a hydrogen explosion. Then, on March 14 at 11:01 a.m. the No. 3 reactor also experienced a hydrogen explosion. The No. 4 reactor was already offline at the time of the disaster for a regular inspection, but hydrogen from the adjacent No. 3 reactor leaked in, and it suffered a hydrogen explosion as well at 6:14 a.m. on March 15. The No. 2 reactor was not hit by a hydrogen explosion, but among the No. 1 through 3 reactors it is thought to have leaked the most radiation. The disaster is rated a 7 on the International Nuclear Event Scale, the same as the Chernobyl disaster.
Masao Yoshida, the late chief of the Fukushima plant who headed up the frontline disaster-response efforts, testified to a government panel investigating the disaster, "We (who were on-site) imagined it as the destruction of eastern Japan. I really thought we were dead."
Four reports on the disaster were put together, from the national government, the Diet, TEPCO and elsewhere in the private sector. They differ on points such as why the IC in the No. 1 reactor did not activate. The Diet probe raised the possibility that the IC system's piping was damaged in the earthquake, but the national government's investigative panel denied that earthquake damage was the cause. Due to the high radiation levels in the reactor buildings, there has not yet been an on-site investigation to better understand what happened.

April 10, 2016

International forum on decommissioning

Intl. forum discusses Fukushima decommissioning

http://www3.nhk.or.jp/nhkworld/en/news/20160410_22/

An international forum has begun discussing the decommissioning of nuclear reactors at the defunct Fukushima Daiichi plant.

The 2-day forum, the first of its kind, opened in Iwaki City, Fukushima Prefecture, on Sunday.

The meeting was organized by the government-backed Nuclear Damage Compensation and Decommissioning Facilitation Corporation.

The participants include officials from the International Atomic Energy Agency and the Organization for Economic Cooperation and Development.

The mayor of the British Borough of Copeland, Mike Starkie, stressed the importance of information-sharing between plant operators and host communities.

A nuclear plant in his district in western Cumbria, England, has caused accidents twice, and released radioactive substances into the atmosphere.

The mayor said these accidents have had a major impact on the local farming and fishing industries, and farmers and fishermen have been affected by radiation-related rumors.

He said such circumstances provided opportunities for Britain's nuclear power industry and local communities to build a relationship and have frank dialogue.

Robots for decommissioning highly-contaminated nuclear plants were on display at the forum venue. Many participants asked questions about the robots' functions and capabilities.

Only 20 percent of those taking part in the forum are local residents.

The head of the corporation, Hajimu Yamana, told reporters that many local residents probably didn't know about the forum as it is being held for the first time.

He said **the forum has 2 purposes: to promote technical debate among experts in Japan and other countries and to provide information for residents of Fukushima and the surrounding areas.** He said the corporation wants to work out ways to fulfil both of these aims.

The forum will close on Monday.

April 11, 2016

What is decommissioning like?

News Navigator: What exactly is reactor decommissioning work?

http://mainichi.jp/english/articles/20160411/p2a/00m/0na/023000c

Reactor decommissioning workers wearing protective suits are seen at the Fukushima No. 1 nuclear plant on Feb. 23, 2016. (Mainichi)

Reactor decommissioning workers wearing protective suits are seen at the Fukushima No. 1 nuclear plant on Feb. 23, 2016. (Mainichi)

The Mainichi answers some common questions readers may have about the reactor decommissioning work at the disaster-stricken Fukushima No. 1 nuclear plant.

Q: What exactly does "decommissioning" mean?

A: This refers to the series of procedures that take place when dismantling and removing the buildings on the grounds of a nuclear power plant. Preparatory work is presently being undertaken at the Fukushima No. 1 plant in the lead-up to 2021, when melted nuclear fuel will be removed from the containment vessels in reactors number 1 through 3.

Q: How far has the work progressed over the past five years?

A: Considering the total process, **things are only just getting started**. At the Fukushima plant, decommissioning work must be carried out simultaneously upon the three reactors where the nuclear fuel has melted. The entire process is expected to take between 30 and 40 years. Since the work began at the end of 2011, it will likely go on until 2041 or 2051.

Q: What kind of work is being done at the plant?

The No. 3 reactor building at the Fukushima No. 1 nuclear plant is seen on Feb. 23, 2016. (Mainichi)

The No. 3 reactor building at the Fukushima No. 1 nuclear plant is seen on Feb. 23, 2016. (Mainichi)

A: Every day, some 7,000 workers come onto the grounds of the nuclear power plant to engage in a countless number of tasks including clearing away rubble, erecting tanks to store contaminated water, and going around the plant to check on leakage of the contaminated water, to name just a few.

Q: Isn't it dangerous?

A: To avoid radioactive contamination, workers change into protective suits. Employees are also equipped with devices on their bodies to measure the levels of radiation and full-face masks that are worn when working in areas where the figure is high.
In addition to being exposed to radiation, this work also carries the risk of heatstroke during the summer from wearing the protective suits.
No nuclear reactors have been completely decommissioned at a commercial nuclear power plant that has experienced a large-scale accident such as that seen at the Fukushima No. 1 Nuclear Power Plant. At the Chernobyl Nuclear Power Plant in the former Soviet Union, where an accident occurred in 1986, such work is still ongoing today.
If the reactor decommissioning is delayed in Fukushima, it is possible that this will negatively impact the prefecture's recovery. In order for the work to be completed in a timely manner, then, support for the workers must come from citizens everywhere in the country.

May 10, 2016

Ehime reactor 6th to be scrapped

40-year-old Shikoku reactor to be sixth unit scrapped under stricter safety regimen

http://www.japantimes.co.jp/news/2016/05/10/national/40-year-old-shikoku-reactor-sixth-unit-scrapped-stricter-safety-regimen/#.VzF6L-Rdeot

Kyodo

MATSUYAMA, EHIME PREF. – Shikoku Electric Power Co. on Tuesday ended operation of a nearly 40-year old nuclear reactor in western Japan, making it the sixth unit to be scrapped under stricter safety regulations introduced after the 2011 Fukushima disaster started.
The utility decided in March to decommission the idled reactor 1 at its Ikata nuclear complex in Ehime Prefecture, as it would be too costly to reboot the aging reactor.
The company estimates more than ¥170 billion ($1.59 billion) would be needed to beef up safety measures for restarting the reactor, which started operation in 1977.
It is expected to take about 30 years to complete the decommissioning of the reactor at a total cost of ¥40 billion, according to Shikoku Electric.
The company is banking on technology cooperation that it agreed on with three other regional utilities last month to cut decommissioning costs.
The tougher safety rules prohibit the operation of nuclear reactors beyond 40 years in principle. But operation for an additional 20 years is possible if operators make safety upgrades and pass the regulator's screening.
The government is looking to reactivate more reactors to meet a goal of generating at least 20 percent of Japan's overall electricity with nuclear power generation by 2030.
The shutdown of the Ikata reactor 1 reduced the number of commercial reactors in Japan to 42, of which four have been restarted under the post-Fukushima safety rules. But two of the four were shut down earlier this year following a court decision banning them from resuming operations.
With new reactor construction difficult amid public concern over the safety of nuclear power, the country would need a dozen of the aging reactors to operate beyond the 40-year limit to accomplish the government goal, industry observers say.
Shikoku Electric has said it would not make economic sense to restart the unit 1 given the cost and the fact that it has a relatively small output capacity of 566,000 kw, while the company aims to reboot the larger and newer reactor 3 at the same power plant.
The town of Ikata expects the scrapping of the aging reactor to reduce state subsidies that it receives for hosting the nuclear complex by ¥300 million to ¥400 million to around ¥1 billion.

May 13, 2016

Decommissioning suspended to avoid risks during G7 meeting

Tepco to put some Fukushima decommissioning work on hold during G-7 summit

http://www.japantimes.co.jp/news/2016/05/13/national/tepco-put-fukushima-decommissioning-work-hold-g-7-summit/#.VzYtwORdeot

by Reiji Yoshida

Staff Writer
The majority of decommissioning work at the damaged Fukushima No. 1 nuclear plant will be put on hold while the Group of Seven summit takes place in Shima, Mie Prefecture, on May 26 to 27, according to Tokyo Electric Power Co.
Satoshi Togawa, a spokesman for Tepco, told The Japan Times on Friday that the planned suspension was a precaution to reduce "risks" that could disturb the meeting of leaders from the seven major advanced nations.
Such risks could include unexpected leaks of contaminated water from tanks or airborne radioactive material monitoring alarms being triggered, Togawa said.

Tepco will continue other essential operations, such as injecting water to keep melted nuclear fuel cool and processing contaminated water, Togawa said.
The spokesman said the suspension was not designed to reduce the risk of terrorism.
“We have made the decision without any request from the government,” he said.
A 2011 massive earthquake and ensuing tsunami knocked out critical cooling functions for three of six reactors at the plant, triggering a triple meltdown.
The decommissioning effort, which involves some 7,000 workers, is expected to take more than 40 years.

May 31, 2016

New device to clear debris from No.1

TEPCO clearing radioactive debris from reactor

http://www3.nhk.or.jp/nhkworld/en/news/20160531_01/

The operator of the Fukushima Daiichi nuclear plant is using a vacuum-like device to clear radioactive debris from a damaged reactor building.

The No. 1 reactor building suffered a hydrogen explosion in 2011. The top floor of the building is scattered with relatively small pieces of rubble, including iron frames and concrete. The debris is an obstacle to plans to remove nuclear fuel from a cooling pool in the building.

On Monday, a device measuring 13 meters long and 5 meters high was lifted by crane to the building. It is fitted with a hose capable of sucking up objects weighing as much as 20 kilograms.

Tokyo Electric Power Company says it wants to complete the work in July and move on to larger pieces of debris next year. The company hopes to start removing the nuclear fuel in about four years.

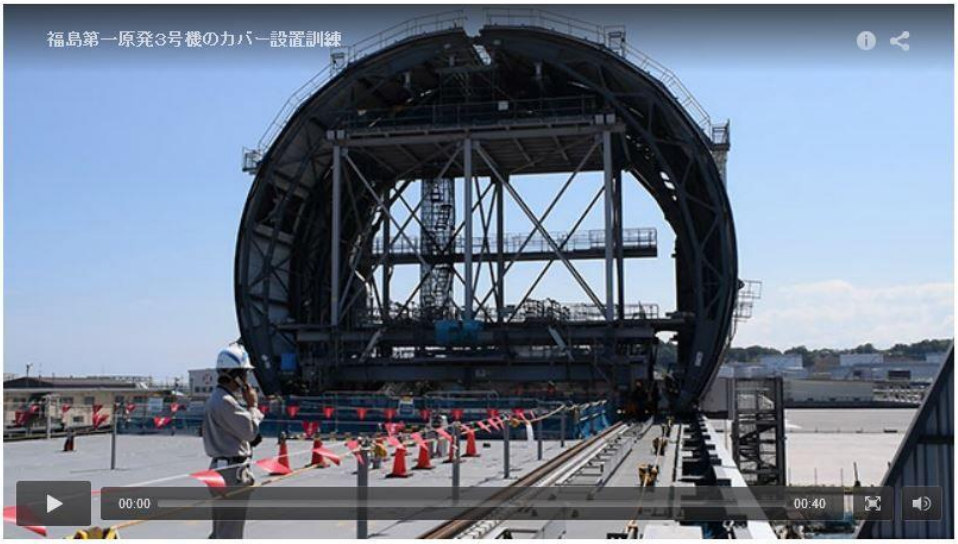
The company says workers are spraying chemical agents and taking other steps to prevent the spread of radioactive dust.

TEPCO came under fire in 2013, when work to remove rubble from the No. 3 reactor building resulted in radioactive substances being dispersed to surrounding areas.

The company says that during the work on Monday, no abnormalities were detected in radiation levels or in the count of radioactive particles.

June 13, 2016

A dome for reactor No.3



An engineer with Tokyo Electric Power Co. explains how a massive cover will be built over the No. 3 reactor building of the Fukushima No. 1 nuclear power plant during a practice run at Onahama port in Iwaki, Fukushima Prefecture, on June 10. (Kenji Izawa)

An engineer with Tokyo Electric Power Co. explains how a massive cover will be built over the No. 3 reactor building of the Fukushima No. 1 nuclear power plant during a practice run at Onahama port in Iwaki, Fukushima Prefecture, on June 10. (Kenji Izawa)

Dry run kicks off to build huge dome over damaged reactor

http://www.asahi.com/ajw/articles/AJ201606130029.html

By KENJI IZAWA/ Staff Writer

IWAKI, Fukushima Prefecture--A dress rehearsal is under way to install a huge "hat" over a crippled reactor building at the Fukushima No. 1 nuclear power plant.

The bulky dome-shaped cover is meant to stop the spread of radioactive material and protect equipment necessary to retrieve 566 bundles of nuclear fuel rods from a storage pool in the No. 3 reactor building.

The simulation is designed to get workers fully drilled so they can set up the cover quickly, reducing the time they are exposed to radiation.

Tokyo Electric Power Co., operator of the crippled plant, has started simulating the process at Onahama port in Iwaki.

On June 10, TEPCO invited reporters to witness part of the drill in which portions of the cover measuring about 18 meters high were moved on a rail for about 50 meters.

The No. 3 reactor building, where a meltdown occurred after the March 2011 Great East Japan Earthquake and resulting tsunami, still has an extremely high reading of radiation.

TEPCO plans to begin retrieving the fuel rods during fiscal 2017, starting in April next year.

The drill is expected to continue through this month to ensure there are no flaws in the working procedures and safety measures.

TEPCO plans to first decontaminate the No. 3 reactor building and put up shields so that radiation levels drop when the massive cover is installed.

The cover used in the drill will be dismantled and then shipped to the power plant for reassembly and use in the actual retrieval.

June 30, 2016

No.2: Fuel may still be in the reactor

Melted fuel may be at the bottom of No.2 reactor

http://www3.nhk.or.jp/nhkworld/en/news/20160630_07/

NHK has learned it is highly likely that a large amount of melted nuclear fuel remains at the bottom of one of the damaged reactors at the Fukushima Daiichi nuclear power plant.

Experts from Tokyo Electric Power Company and other institutions confirmed a large black shadow at the bottom of the No.2 reactor, using a device that uses elementary particles called muons.

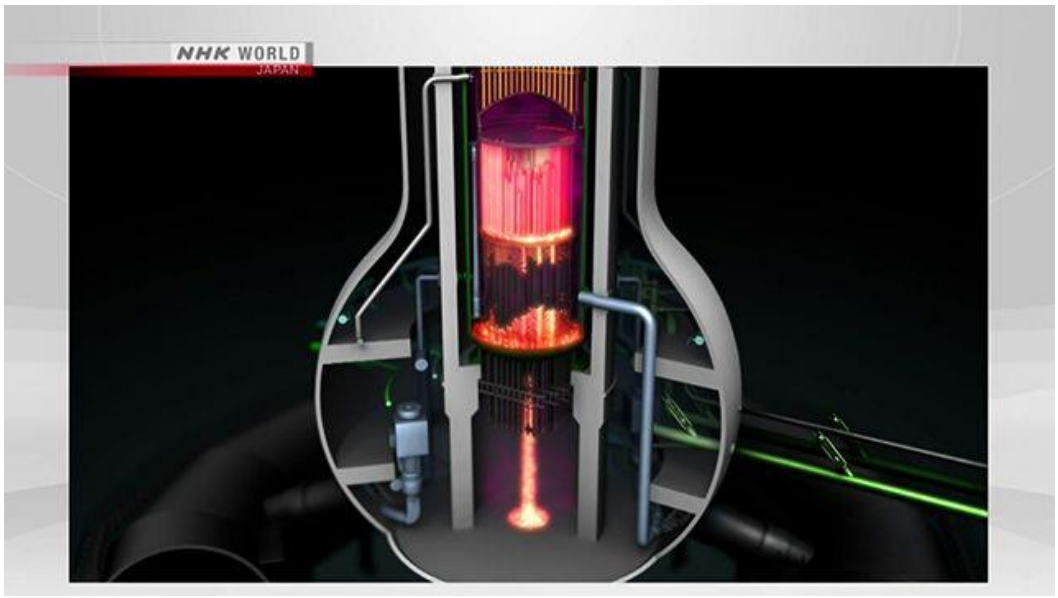
The probe to see into the reactor's interior has been conducted with the High Energy Accelerator Research Organization and others.

The analyses of the image led the experts to believe that most of the melted fuel is likely located at the bottom of the reactor together with other structures in the reactor.

This is the first time that an image of what's believed to be molten fuel has been captured. Similar shadows are said to have been confirmed also on the walls of the reactor.

The results of the probe have a considerable impact on a process to remove melted fuel, the most difficult part of reactor decommissioning.
TEPCO is conducting further analyses of the reactor.

During the accident in 2011, nuclear fuel melted down in the plant's 3 reactors. Most of the fuel in the No.1 reactor is believed to have melted through the core. But the locations of the fuel in the No.2 and 3 reactors are not yet known.



Probe Spots Signs of Molten Nuclear Fuel

Workers who are trying to decommission the crippled nuclear reactors in Fukushima say they've made a discovery that might lead to the first step in the process.
They've told NHK they think they've located the molten fuel in one of the reactors.
Experts from Tokyo Electric Power Company and other institutions say it's highly likely there's still a large amount of fuel at the bottom of the No.2 reactor.
Finding the fuel has been a long and costly challenge.
Scientists developed a device that fires elementary particles called muons into the reactor, then takes an x-ray-like image.
It showed a large black shadow at the bottom of the reactor, and they saw similar shadows on the reactor walls.
Meltdowns occurred at 3 reactors after the earthquake and tsunami in March 2011.
Earlier surveys suggested the fuel in the No.1 reactor melted through the pressure vessel. But the experts have been struggling to determine what happened in reactors 2 and 3.

July 14, 2016

Sarcophagus for Fukushima too?

'Stone coffin' eyed for decommissioning Fukushima plant: report

http://mainichi.jp/english/articles/20160714/p2a/00m/0na/009000c

The government-funded Nuclear Damage Compensation and Decommissioning Facilitation Corp. (NDF) eyes an option of covering the disaster stricken Fukushima No. 1 Nuclear Power Plant with concrete in the future as in the Chernobyl disaster, it has been learned.
In its first planning report drawn up on July 13, the NDF leaves room for adopting the "sarcophagus (stone coffin) method," in which nuclear fuel debris that melted in the Fukushima crisis will be confined inside reactor buildings using concrete and other materials.
The NDF points out in the report that it will be difficult to manage such a sarcophagus safely over a long period of time, and emphasizes that it is planning to remove fuel debris from the Fukushima nuclear plant for now. However, the report also says, "It is appropriate to flexibly review the plan in accordance with the conditions inside (nuclear reactors and other parts) that will be revealed later."
The report also states, "It is necessary to fully consider the uncertainties over passing down responsibilities for a long period of time and concerns over easy postponement from one generation to another."
The sarcophagus method was adopted at the Chernobyl nuclear complex in the former Soviet Union in the wake of the core meltdowns there in 1986.

July 15, 2016

No sarcophagus, says Minister for Industry

State minister rules out sarcophagus option

http://www3.nhk.or.jp/nhkworld/en/news/20160715_27/

Japan's state minister for industry has ruled out the option of sealing off disabled reactors at the Fukushima Daiichi nuclear plant with a Chernobyl-style sarcophagus.

Yosuke Takagi met Fukushima Governor Masao Uchibori in Tokyo on Friday.

Uchibori said he was shocked to hear the word "sarcophagus" and called the option unacceptable.

Two days earlier, a government body charged with decommissioning the plant operated by Tokyo Electric Power Company mentioned the sarcophagus method for the first time.

The body said it remained committed to removing fuel debris from the reactors that suffered meltdowns in the March 2011 accident. But it presented a technical report that left room for entombing the reactors in a massive metal and concrete structure.

Responding to Uchibori, Takagi said the government has no intention of using such an option, and that completing the decommissioning process is the top priority.

Takagi said the government's policy is to stand by the people of Fukushima, and that his ministry has told the decommissioning body to rewrite its technical report.

July 21, 2016

Local residents shocked at the idea of "sarcophagus"

Reactor decommissioning plan revised

http://www3.nhk.or.jp/nhkworld/en/news/20160720_32/

A Japanese government body has revised its plan to decommission the reactors at the Fukushima Daiichi nuclear plant in response to local opposition.

The revision ruled out the option of adopting a Chernobyl-style "sarcophagus" method that seals off disabled reactors with nuclear fuel inside.

The Nuclear Damage Compensation and Decommissioning Facilitation Corporation released the revised plan on Wednesday.

The body presented a technical report a week ago that mentioned the possibility of adopting the sarcophagus method for the first time, while saying it remained committed to removing fuel debris from the reactors.

The report faced backlash from the people in Fukushima Prefecture. Economy, Trade and Industry Minister Motoo Hayashi instructed the body to revise the plan.

The word "sarcophagus" has been deleted from the revised plan, which states that the method will not be adopted in the decommissioning process at the plant.

Shunsuke Kondo, the head of the body's technical committee, says he regrets the body's lack of consideration for the locals.

He said he will make sure the body communicates with the locals properly and places top priority on their thoughts.

Fukushima Governor Masao Uchibori said he wants the body to realize how shocked the Fukushima residents were with the word "sarcophagus."

He said he wants the body to proceed with the removal of fuel debris from the reactors in a safe manner, in line with the locals' desires.

July 29, 2016

Decommissioning too expensive for TEPCO

TEPCO to seek gov't assistance in decommissioning Fukushima nuke plant

Tokyo Electric Power Co. (TEPCO) Holdings, Inc. is set to ask the national government for financial assistance in decommissioning the disaster-hit Fukushima No. 1 Nuclear Power Plant, company officials said.

- 【Related】Bulk of melted fuel at bottom of Fukushima No. 2 reactor vessel

The company will also seek consultations with the government over how it should foot the costs of paying compensation to those affected by the nuclear crisis and decontaminating areas affected by radioactive substances from the power station.
TEPCO Holdings has deemed that it cannot secure enough funds to fully cover these costs through its own efforts alone since the expenses are increasingly likely to surpass its estimates.
The utility has secured approximately 1 trillion yen to cover the expenses of decommissioning the crippled power plant and planned to raise another 1 trillion yen. However, it is expected to take the company 30 to 40 years to decommission the plant and deal with the aftermath of the crisis. Moreover, it has been pointed out that **the actual decommissioning costs will far surpass 2 trillion yen.**
At a news conference on July 28, Fumio Sudo, chairman of TEPCO Holdings, expressed fear that the company will face increased costs of shutting down the plant, pointing out that **the decommission project is "work that nobody in the world has experienced."**
The utility currently pays compensation and covers the costs of decontamination work by borrowing money from the state through the Nuclear Damage Compensation and Decontamination Facilitation Corp.
However, the amount of compensation that the utility has so far paid has already reached 6 trillion yen, surpassing the 5.4 trillion yen initial plan. Moreover, decontamination costs are also expected to surpass 2.5 trillion yen as originally planned.
There are no prospects that operations at TEPCO's Kashiwazaki-Kariwa Nuclear Power Plant in Niigata Prefecture, which would help increase the company's profits, will be resumed in the foreseeable future. Moreover, TEPCO has faced intensifying competition in the electric power market as the retailing of power was fully liberalized in April. Under these circumstances, TEPCO Holdings is expected to ask the government to provide the firm with an infusion of public funds among other financial aid.

September 3, 2016

Decontamination: How far are we?

News Navigator: How far has decontamination progressed in Fukushima?

http://mainichi.jp/english/articles/20160903/p2a/00m/0na/001000c

The Mainichi Shimbun answers some common questions readers may have about the decontamination of areas that were heavily exposed to radiation in the nuclear crisis at the Fukushima No. 1 Nuclear Power Plant.

Question: What is the situation right now with the decontamination of areas that were exposed to radioactive materials in the Fukushima nuclear incident, where residents were ordered to evacuate?

Answer: In April 2012, areas that were under evacuation orders were separated into three categories based on annual radiation exposure dosages. Decontamination work has not been carried out in areas of the Fukushima Prefecture towns of Okuma, Futaba, Namie, Tomioka, and the prefectural villages of Iitate and Katsurao and the city of Minamisoma -- classified as "difficult-to-return zones" with annual radiation exposure dosages topping 50 millisieverts -- save for a few areas that were decontaminated on a trial basis.

Meanwhile, in "restricted residence zones," where the annual radiation exposure dosage is between 20 and 50 millisieverts, and in "preparing for lifting of evacuation order zones," which have annual radiation exposure dosages of 20 millisieverts or lower, the government is aiming to have decontamination completed by March 2017.

Q: Why haven't "difficult-to-return zones" been decontaminated?

A: In addition to the fact that all residents had evacuated, it was determined immediately after the disaster broke out that decontamination efforts would be ineffective because of the high levels of radiation there. However, radiation has the property of decreasing as time passes. Indeed, according to measurements taken by an airplane that was released by the Nuclear Regulation Authority in February this year, radiation levels had gone down significantly. And in some areas, where decontamination was attempted on a trial basis, there was some success.

Q: How much does radiation go down through the decontamination process?

A: According to the Environment Ministry, in a trial decontamination of the Akougi district in Namie, Fukushima Prefecture -- designated a "difficult-to-return zone" -- radiation levels went down by half. However, a ministry official explains that radiation levels there cannot be brought down to zero because even if the area is decontaminated, radiation seeps in via rain and other means.

Q: What is done with the waste that results from decontamination?

A: The Environment Ministry estimates that 16 million to 22 million cubic meters of radioactively contaminated waste will result from decontamination work. That waste will be stored temporarily in municipalities in Fukushima Prefecture, then transported to interim storage facilities in the prefectural towns of Okuma and Futaba. However, only 5 percent of the entire land area needed for storing radioactive waste had been secured as of late July. (Answers by Hanayo Kuno, Science and Environment News Department)

September 4, 2016

Robots needed for Fukushima

Robot technologies sought for Fukushima reactors

http://www3.nhk.or.jp/nhkworld/en/news/20160904_12/

Japan's academic societies are soliciting robot technologies that will allow direct surveying of molten fuel in the crippled nuclear reactors in Fukushima.

The atomic energy society and robotics society are seeking ideas for remotely-controlled robots that could travel 25 meters through water and complicated ductworks to reach the fuel and return with samples.

Removing the molten fuel is considered the most difficult step in dismantling the plant.

The Japanese government and Tokyo Electric Power Company have been using robots to survey around the reactors, with a hope to begin removing the molten fuel by 2021.

But highly dangerous conditions in the buildings and the accumulation of tainted water have hampered the work, and workers have yet to reach the molten fuel.

Officials at the societies say they want to test some of the ideas at a research facility near the plant and hope to use them in actual probes.

The deadline for applications is set for the end of January.

September 6, 2016

New robot to locate melted fuel in No.2 reactor

Robot to probe nuke fuel debris in Fukushima No. 2 reactor

http://www.asahi.com/ajw/articles/AJ201609060001.html

By TAKASHI SUGIMOTO/ Staff Writer
A robot will be sent into the No. 2 reactor containment vessel at the crippled Fukushima No. 1 nuclear power plant to locate the melted fuel inside and assess its spread ahead of future retrieval.
Tokyo Electric Power Co. announced on Aug. 25 that it would undertake the difficult operation early next year at the soonest.
Under consideration for the work is a scorpion-shaped robot developed by Toshiba Corp., whose slender body allows it to pass through narrow openings. It is designed to raise its rear camera toward the front to capture images when it has arrived at a planned survey location.
The robot will crawl through an entrance into the No. 2 reactor containment vessel and travel along a rail to go deeper into its interior and confirm the state of the melted fuel inside and other conditions.
TEPCO and other parties are planning to draw on the survey results to decide on the fuel retrieval method as early as fiscal 2018 and set out on the actual retrieval process, expected to pose extreme difficulties, in 2021.

The initial plan would have sent the “scorpion" into the No. 2 reactor last summer, but radiation levels around the entrance were so high that cleanup work had to be done to reduce them for workers who would be sending the scorpion in.
Remote operations to remove a steel plate that blocked the entrance also turned out to be a time-consuming process.
If the operation to send the robot proceeds as planned, its use will still be a year and a half behind schedule.
Robots of a similar kind were sent last year into the No. 1 reactor and were partially successful in capturing images inside the containment vessel. However, the survey has had rough going, as the robots failed to spot any fuel.
TEPCO and the government are planning to draw on the robot survey results and other information to make a decision in fiscal 2018 on the melted fuel retrieval method for the No. 1, No. 2 or No. 3 reactors.
They are hoping to use the “submersion method,” which would involve filling the containment vessel with water to reduce worker radiation doses, during the retrieval work to be started in 2021.
However, water is leaking from holes in the containment vessels, and the holes have yet to be located.
TEPCO and other parties have begun weighing alternative retrieval methods that do not involve filling the containment vessels with water.

September 8, 2016

70 years to decommission Tokai?

Decommissioning plan at Tokai questioned by NRA

http://www3.nhk.or.jp/nhkworld/en/news/20160909_03/

Japan's nuclear regulator has questioned an industry agency's plan that says it will take about 70 years to scrap a spent fuel reprocessing facility. The regulator calls the plan too vague.

Two years ago Japan Atomic Energy Agency, based in Tokai Village north of Tokyo, decided to decommission a facility for reprocessing spent nuclear fuel.

The massive costs needed to reform the plant to meet new government regulations after the 2011 Fukushima nuclear accident led to the decision.

On Thursday the agency proposed a timeline to the Nuclear Regulation Authority for shutting down the facility.

The schedule says it will take about 70 years overall to take out nuclear waste, demolish and remove equipment, and decontaminate buildings.

The operator says if it were an ordinary reactor, it would take about 30 years, but the scrapping of a reprocessing plant needs more time. It cites many kinds of nuclear waste as well as the volume, and more buildings.

But experts at the NRA pointed out that the agency's plan lacked detail. The agency officials promised to submit a revised plan by the end of November.

The agency plans to formally apply for the decommissioning during fiscal 2017. But whether it can

present a detailed plan is unclear as how to process some of the nuclear waste and where to store it have not been decided.

September 13, 2016

No.1 reactor exposed

The outer layer of the crippled No. 1 reactor building at the Fukushima No. 1 nuclear power plant is exposed as Tokyo Electric Power Co. removes one of the panels covering the facility at 6:22 a.m. on Sept. 13. (Pool)

Fukushima plant building exposed as TEPCO opens old wounds

http://www.asahi.com/ajw/articles/AJ201609130070.html

By CHIKAKO KAWAHARA/ Staff Writer
The devastated outer layer of Fukushima No. 1 nuclear power plant's No. 1 reactor building has been exposed for the first time in almost five years in the painstaking reactor decommissioning process.
Plant operator Tokyo Electric Power Co. began removing on Sept. 13 the exterior walls of the cover installed around the structure to prevent the dispersal of radioactive materials on Sept. 13.
Shortly past 6 a.m., a large crane began removing a massive piece of the cover installed around the reactor building. The panel dismantled that day measured 23 by 17 meters and weighed 20 tons.
The cover was installed in October 2011 as a temporary measure after a nuclear meltdown occurred following the Great East Japan Earthquake and tsunami in March that year. The meltdown caused a hydrogen explosion, blowing the walls off the building.
Once the cover is dismantled, the operator can assess the state of the building's interiors and remove the debris fallen onto the spent fuel pool inside.
"Steady progress is necessary in reconstruction, but we hope they will carry on the procedure with safety as the No. 1 priority," said a Fukushima prefectural government official.

TEPCO said that it plans to remove the remaining 17 panels of the covering by the end of the year. The portion covering the roof has already been removed.
Once the cover is removed, the utility will begin drawing up plans to remove the 392 fuel assemblies from the spent fuel pool and melted nuclear fuel from inside the building.
The plant operator said that it plans to be extra careful during the procedure. It will shroud the building in tarpaulins once the cover is removed as a precautionary measure against dust and other materials containing radioactive materials from being carried aloft by the wind.
The utility and central government's joint schedule for the decommissioning process of the reactor states that the removal of the fuel rods from the pool will start in fiscal 2020.

October 12, 2016

880 tons of fuel debris

Melted fuel debris at crippled Fukushima reactors estimated at 880 tons, triple that of fuel proper

http://www.fukushimaminponews.com/news.html?id=739

Nuclear fuel mixed with debris left inside three crippled reactors at Tokyo Electric Power Co.'s Fukushima Daiichi plant after their meltdowns in the 2011 accident is estimated at 880 tons, including concrete and other structural materials. The fuel debris is believed to be about three times as heavy as fuel proper. The findings were based on data on conditions inside the reactors immediately after the accident, the proportion of fuel to total debris and other figures obtained by a computer analysis system of the International Research Institute for Nuclear Decommissioning (IRID), a government-business think tank tasked with studying ways of decommissioning the plant. The debris weight is expected to be some key reference data in the lead-up to its future removal, regarded as the most difficult phase of decommissioning work.

The weight of nuclear fuel left inside the Nos. 1-3 reactors at the time of the accident was estimated at 69 tons, 94 tons and 94 tons, respectively, adding up to 257 tons. The mixture of fuel and debris was estimated to weigh 279 tons, 237 tons and 364 tons, respectively, for a total of 880 tons, or 2.5 times to four times the weight of fuel. The fuel is believed to have mixed with stainless steel pressure vessel components, zirconium fuel rods and the concrete bottoms of containment vessels when it melted down.

Of the fuel debris in the Nos. 1 and 3 reactors, nuclear fuel and stainless steel -- the main component of the debris -- accounted for about 30% each, and concrete materials around 40%, according to the IRID analysis. In the No. 2 reactor, fuel and stainless steel constituted a total of some 70% and concrete elements the rest.

The IRID analyzed data on conditions inside each reactor right after the accident, including pressure, temperature and the amount of water injected, as well as the results of muon tomography scans inside the No. 1 reactor that used muon beams stemming from cosmic rays. Multiple computer analysis programs were used for the study to evaluate fuel debris movements in a comprehensive manner, and the figures thus obtained are as close to reality to the maximum possible extent currently, according to IRID. In the case of the No. 2 reactor, however, there is a possibility of discrepancies being caused in weight data between the estimated and actual figures because the amount of water injection is not

known, making it difficult to presume fuel debris movements.

(Translated by Kyodo News)

October 15, 2016

Decommissioning means big money. Taxpayers beware!

Fukui poised to benefit from decision to scrap Monju

http://www.japantimes.co.jp/news/2016/10/15/national/fukui-poised-benefit-decision-scrap-monju/#.WAJdL8ldeos

by Eric Johnston
Staff Writer

*Big money pull a million strings*Big money hold the prize
Big money weave a mighty web
Big money draw the flies
— Rush, "The Big Money"

Last month's announcement that the Monju experimental fast-breeder reactor in Tsuruga, Fukui Prefecture, would likely be decommissioned was an acknowledgement of what had been obvious for decades. Namely, that Monju was too fraught with technical and political problems to have ever stood a chance of success.

For Kansai, the decision brought a feeling of relief among those concerned about a plutonium-producing plant in their backyard, but a feeling of "now what?" among everyone else. No political leader in Osaka, Kyoto, Nara or Kobe either wistfully eulogized or passionately protested the recommendation that Monju, which has cost more than ¥1 trillion, be scrapped. In Fukui, however, it was a different story.

For more than four decades, Fukui's leaders have finessed the art of extracting (extorting?) as much money from Tokyo as possible in exchange for cooperation in continuing not only Monju but also 13 commercial nuclear reactors, a concentration of nuclear power plants said to be the densest in the world.

Massive amounts of tax money were funneled into the prefecture by the Liberal Democratic Party for all sorts of uses. Some were noble (construction of modern train stations, schools, hospitals and social welfare facilities). Some were corrupt (propaganda museums that played down the risks of nuclear power, all expense-paid "study" tours to Europe's nuclear reactor towns for local residents that included sightseeing trips to Paris).

Nobody really knows how much money, directly and indirectly, went to Fukui and Tsuruga over the decades for "bearing the burden of Monju." Unofficial guesses put the figure in the billions of yen. But what has residents in Kansai, and elsewhere, concerned is how much it will cost them, in the form of future government payoffs to Fukui, to be rid of Monju.

The prefecture certainly has friends in high places looking out for its interests. Defense Minister Tomomi Inada, a favorite of Shinzo Abe, represents Fukui's 1st district. That's the one without nuclear power plants, but she's very close to those in Fukui who support them. Then there's Tsuyoshi Takagi, who served as reconstruction minister. He's from Tsuruga and represents Fukui's 2nd district in the

Lower House, an area that hosts those 13 commercial nuclear reactors. In short, Fukui has powerful allies who will work hard to ensure all manner of new funding flows to the prefecture and to Tsuruga over the coming decades.
Making matters better for Fukui but worse for taxpayers elsewhere, three commercial reactors will be decommissioned over the next few decades. You can be sure Fukui politicians from the governor on down are drawing up a long wish-list of pork barrel projects they will demand the central government, as well operator Kansai Electric Power Co., fork out in exchange for consenting to each reactor's decommissioning plans — plans that might include disposing high-level radioactive waste generated by decommissioning in Fukui, over the objections of residents.
In short, **decommissioning means big money for Fukui in the years ahead in the form of subsidies, jobs and service-industry income. And not just at Monju, where the basic cost was recently estimated at ¥540 billion.**
With predictions it might cost ¥8 trillion to scrap the crippled Fukushima No. 1 nuclear power plant, and perhaps a dozen commercial reactors probably heading for the scrap heap in the next decade, Japan has entered the "age of nuclear power decommissioning."
There's big money involved that will draw a swarm of flies, especially in towns and prefectures hosting the power plants. Taxpayers elsewhere, therefore, will need to be especially vigilant and handy with the flyswatters and insect repellent.
View from Osaka is a monthly column that examines the latest news from a Kansai perspective.

Argument that nukes are cheaper is not tenable

Cost of pulling plug on reactors

http://www.japantimes.co.jp/opinion/2016/10/15/editorials/cost-pulling-plug-reactors/#.WAJd3cldeos

In its latest discussions on electricity market reform, the Ministry of Economy, Trade and Industry is reportedly considering a measure to financially help major power companies with decommissioning their nuclear plants. METI is reportedly weighing having new entrants to the liberalized power retail market shoulder part of the decommissioning cost, which would be added to the electricity bills of their customers. That would be nothing less than welfare for the major suppliers that are seeing nuclear power lose its cost advantages in the face of power retail deregulation since April. The government should avoid policies that could distort the principles of electricity business liberalization.
In its discussions launched in late September, the ministry says the committee will weigh establishing a system that would have power suppliers respond to "issues of public interest," such as investments to prepare for decommissioning nuclear plants and severe nuclear accidents amid market liberalization. That sounds like a legitimate question to consider, but the measures contemplated by the ministry pose many problems.
One is a change to the accounting system for decommissioning nuclear power plants. Tokyo Electric Power faces massive financial problems in dealing with its Fukushima No. 1 plant, which suffered triple meltdowns after it was hit by the March 2011 Great East Japan Earthquake and tsunami. The cost to decommission the crippled plant is certain to far exceed the estimated ¥2 trillion — in fact it is impossible to grasp the total cost at this stage since the technology to remove molten nuclear fuel from its reactors has not yet been established. Compensation for victims of the nuclear disaster, which was estimated in 2014 at ¥4.9 trillion, has already topped ¥6 trillion. The cost to decontaminate areas polluted with radioactive fallout from the plant is likely to top ¥2.5 trillion in the government's plan.
Even in the absence of a major disaster like the Fukushima catastrophe, the major utilities operating nuclear power plants face a shortage in financial reserves to pay for decommissioning as they needed

to scrap the plants earlier than scheduled in response to the tightened plant regulations following the Fukushima disaster, along with the overshooting of the cost of decommissioning from earlier forecasts. Besides Tokyo Electric, five major power firms have made decisions to decommission six of their reactors — one each for Kyushu Electric, Chugoku Electric, Shikoku Electric and Japan Atomic Power and two for Kansai Electric.

To cover the bloated expenses of decommissioning, the ministry is thinking of having all electricity suppliers — including new entrants to the market that do not run nuclear power plants — share the cost in the form of surcharges to the fees that they pay for accessing power transmission lines to service their customers. The cost will then be added to customers' electricity bills.

Under the current system, the major suppliers operating nuclear power plants can include the cost of decommissioning them in the future — along with all other expenses in their power generation — in their electricity charges. But that system will be abolished in 2020, when their power transmission and distribution sections are to be separated from the power generation operations in the final phase of the reform. The idea of having all suppliers — and consequently all consumers — pay for the cost of decommissioning nuclear plants is intended to cope with this change. However, such a measure will blur the responsibility of major power companies that have relied heavily on nuclear power generation and miscalculated the related costs.

That will also have the effect of denying consumers the right to refuse to pay for electricity generated by nuclear power. The retail market liberalization in April enabled consumers to choose power suppliers, instead of being tied to regional monopolies. Some suppliers offer electricity mainly generated by renewable sources such as solar and wind. But applying the surcharge to all suppliers will result in forcing all consumers — including those who may not want to buy electricity from the former monopolies that run nuclear plants — to shoulder the cost of decommissioning.

The ministry's committee is also reportedly weighing a scheme to enable suppliers that operate large-scale thermal power plants to receive a certain amount of revenue for keeping the plants even without running them — based on their power-generation capacity. The idea represents another relief measure for major power companies whose thermal power plants saw their operating ratio fall with the sharp rise in renewable sources in recent years. The scheme is touted as necessary to maintain thermal power capacity as a buffer in case the supply from renewable sources decreases. But experience in other countries indicates that such a mechanism is not essential to managing possible fluctuations in the supply of renewable energy.

The government has long based its energy policy on the argument that nuclear power is cheaper than most other forms of power generation. But the fact that it is seeking to introduce a relief measure for major suppliers that run nuclear plants indicates that argument is no longer tenable. The government needs to reflect on the real meaning of the measures it is contemplating.

October 25, 2016

New power firms to pay for decommissioning old plants

New power firms likely to share decommissioning costs for aging nuke reactors

http://mainichi.jp/english/articles/20161025/p2a/00m/0na/013000c

The Ministry of Economy, Trade and Industry is set to have new smaller electric power companies shoulder part of the costs of decommissioning nuclear reactors that major utilities decided to scrap for reasons other than nuclear disasters, it has been learned.

- 【Related】New power firms may have to pay some costs for nuke reactor decommissioning

- 【Related】Editorial: Making new power suppliers pay for reactor decommissioning costs unacceptable

The new power suppliers will be required to share the costs of decommission work for nuclear reactors that major utilities voluntarily decided to scrap after the Nuclear Regulation Authority introduced new safety standards following the 2011 Fukushima nuclear crisis.
Currently, this covers six reactors -- the No. 1 and 2 reactors at Mihama Nuclear Power Plant in Fukui Prefecture operated by Kansai Electric Power Co., the No. 1 reactor at Japan Atomic Power Co.'s Tsuruga nuclear station also in Fukui Prefecture, the No. 1 reactor at Kyushu Electric Power Co.'s Genkai nuclear plant in Saga Prefecture, the No. 1 reactor at Shimane nuclear station operated by Chugoku Electric Power Co. in the Shimane Prefecture capital of Matsue and the No. 1 reactor at Shikoku Electric Power Co.'s Ikata nuclear power plant in Ehime Prefecture. It is expected, however, that the number of reactors that utilities will scrap is going to increase due to aging reactors across Japan.
The current system in which utilities are required to save up money necessary for reactor decommission projects, collected from electricity bills, will be maintained for reactors that are under operation or under work to be restarted. When utilities decide to scrap such reactors due to aging, however, new power companies will be required to pitch in for the decommission work.
Major utilities currently include a surcharge in electricity fees to cover the costs of decommissioning nuclear reactors, but the economy ministry is concerned that when deregulation of the electricity market is completed by around 2020, the shortfalls for decommissioning costs may not be covered in the current system. The ministry concluded that to make sure that the fees are collected, it needed new power companies to share the burden from 2020.
The ministry plans to have new power suppliers cover the shortfalls of the decommissioning costs as well as pay for depreciation -- money spent on the construction of nuclear plants and capital investment that is allocated later in the assets' useful life -- by adding extra costs on top of fees they pay to major utilities to use their power grids. It is likely that the extra costs the new power companies will pay will be added to electricity bills for those who use power supplied by the new utilities.
The economy ministry had initially considered having new companies share the costs of the decommission work for nuclear reactors whether they are being scrapped or under the process of being restarted, but decided to give up the initial plan after being met with a public backlash.

October 27, 2016

Estimating decommissioning costs has serious flaws

EDITORIAL: Cost estimate needed first to decommission Fukushima plant

http://www.asahi.com/ajw/articles/AJ201610270028.html

An industry ministry panel of experts is tackling two key questions concerning the decommissioning of the crippled Fukushima No. 1 nuclear power plant.
One is how much money will be needed to decommission the plant’s reactors, three of which melted down. The other is who should foot the bill and how.
However, there are some serious flaws in the way the expert panel is working on these knotty questions, which could lead to a huge financial burden on the public.
First of all, the panel’s meetings are not open to the public. The main points of the discussions are published later, but many details, including who made specific remarks, are omitted.

The fate of Tokyo Electric Power Co., which operates the Fukushima plant and is responsible for its decommissioning, will be largely determined by whether it can restart its Kashiwazaki-Kariwa nuclear power plant in Niigata Prefecture.
Panel members include many business leaders who have been promoting nuclear power generation.
The outcome of the recent Niigata gubernatorial election underscored the strong opposition of local residents against TEPCO's plan to bring the plant back online.
The panel's lineup raises concerns that its discussions may be based on the assumption that the Kashiwazaki-Kariwa nuclear plant will eventually be restarted, despite the situation in the prefecture.
Another troubling fact is that the government has yet to announce any estimate of the total decommissioning cost.
In the panel's first meeting, some members urged the government to swiftly present an estimate of the cost. In the second meeting, however, the Ministry of Economy, Trade and Industry only said that annual spending could grow to several hundreds of billions of yen from about 80 billion yen ($703 million) spent now.
The ministry says a specific estimate of the total cost will be announced as early as the end of the year, along with a plan for management reforms at TEPCO and a package of related measures the government will take.
But this timetable doesn't make sense. Pinning down the overall decommissioning cost should be the starting point for the panel's discussions.
With the conditions of the melted nuclear fuel remaining unclear, it is certainly difficult to accurately estimate the cost.
Still, **an estimate should first be shown to ensure substantive debate on whether the method used for the work is appropriate and whether there are ways to curb the cost.**
As for financing, the panel has supported the proposal that TEPCO should secure the necessary funds on its own through management reform over other options, such as the utility's liquidation involving debt forgiveness by its creditors, tax financing by the government and a continuation of the current state control of TEPCO.
In an apparent attempt to stress the importance of TEPCO's own efforts to save itself, the panel has also recommended that the Kashiwazaki-Kariwa nuclear plant should be spun off from TEPCO and integrated with the nuclear power business of another utility.
There is no disputing that TEPCO should push through thorough management reforms to prevent the public from shouldering part of the cost through tax financing or hikes in electricity rates.
The question, however, is whether the embattled utility's own efforts will be enough to cover the entire decommissioning cost, expected to reach several trillions of yen.
If a plan based on the company's own efforts fails and disrupts the decommissioning process, the reconstruction of disaster-hit areas in Fukushima Prefecture could be seriously delayed.
It is vital for the panel to win broad public support for its proposals on the national challenge of decommissioning the Fukushima No. 1 nuclear power plant.
This requires careful, exhaustive and reasonable debate, open to the public, on the cost and the financing method.

November 1, 2016

New fund to decommission Fukushima Daiichi

Industry ministry to create new fund to decommission Fukushima No. 1 plant reactors

http://mainichi.jp/english/articles/20161101/p2a/00m/0na/018000c

The Ministry of Economy, Trade and Industry is poised to set up a system under which Tokyo Electric Power Co. (TEPCO) will accumulate the funds necessary to decommission reactors at its crippled Fukushima No. 1 nuclear plant with the help of a government-backed organization, sources close to the ministry said.

- 【Related】New power firms likely to share decommissioning costs for aging nuke reactors
- 【Related】Fukushima nuclear plant decommissioning cost to surge

Under the system, money that TEPCO accumulates through cost-cutting and other measures will be provided to the Nuclear Damage Compensation and Decommissioning Facilitation Corp. (NDF), which will use the funds when necessary.
The move is aimed at strengthening the central government's involvement in decommissioning the reactors at the tsunami-ravaged power station and securing as much money as possible to cover the costs.
TEPCO has so far raised a total of 2 trillion yen to decommission reactors at the Fukushima No. 1 complex. However, several trillion yen more is highly likely to be needed to decommission the reactors.
The planned scheme will allow the NDF to manage the decommissioning plan and funds to reduce the financial burden on consumers as much as possible, and stably secure funds for decommissioning the reactors at the plant. TEPCO and its subsidiaries will be required to raise as much money as possible to decommission the reactors.
The ministry is considering a plan to add the costs of dismantling reactors at the crippled Fukushima plant to the fees that new, smaller-scale power companies pay for using TEPCO's power cables. However, consumers are critical of the plan, which would force them to shoulder an extra burden for the decommissioning of the reactors. As such, the ministry intends to secure as much money as possible for reactor decommissioning by strengthening the national government's involvement and reforming TEPCO's management.
Once the estimated costs of scrapping the Fukushima No. 1 plant reactors are finalized, TEPCO will be required to set aside a massive amount of funds for such work, possibly falling in a state of capital deficit in which its liabilities exceed its assets. The ministry will therefore take legal measures to allow TEPCO to post its liabilities in installments.

November 6, 2016

An additional 17billlion yen will be needed

Decontamination to cost additional $17 bil.

http://www3.nhk.or.jp/nhkworld/en/news/20161106_18/

It has been revealed that the cost of decontaminating areas affected by the 2011 Fukushima nuclear accident is nearly 1.5 times the initial estimate.

NHK has learned that about 19.5 billion dollars had already been spent on decontamination projects by March this year. The Environment Ministry and the Reconstruction Agency say an additional 17 billion dollars will be needed.

The government cites an increase in personnel costs as one reason for the rising expense.

Tokyo Electric Power Company, the operator of the Fukushima Daiichi nuclear plant, is primarily responsible for shouldering the financial burden.

The government now plans to pay for the decontamination by selling the TEPCO stocks it bought in 2012.

But these shares would have to triple in value to cover the full cost.

The government also says that **more than 10 billion dollars of taxpayers' money will be needed to build facilities to store the waste from the decontamination process.**

November 7, 2016

Scrapping Monju: What of radioactive sodium? What of MOX?

Scrapping of Monju would mean disposal of 760 tons of radioactive sodium, MOX fuel

http://www.japantimes.co.jp/news/2016/11/07/national/monju-scrapping-mean-disposing-760-tons-radioactive-sodium-mox-fuel/#.WCGuysmDmos

JIJI
About 760 tons of radioactive sodium remain in the piping and other equipment of the trouble-prone Monju prototype fast-breeder nuclear reactor, which may be ordered decommissioned, it was learned Sunday.
It has not been decided how to dispose of the radioactive sodium, said sources at the Japan Atomic Energy Agency, the operator of Monju. If the government decides to scrap the reactor, sodium disposal is expected to be a difficult challenge.
Sodium is used as a coolant at Monju, while water is used at conventional nuclear reactors. Sodium is a tricky chemical element that burns intensely if it comes into contact with air or water.
According to the agency, the Monju reactor has some 1,670 tons of sodium. Radioactive substances are contained in 760 tons of the total as it circulates inside the reactor vessel.
The Monju reactor needs to be drained of the sodium if it is to be demolished.
Radioactive and chemically active sodium has to be sealed in containers. There is no precedent of radioactive sodium disposal in Japan.
“We plan to consider the method of disposal if a decision is made to decommission (Monju),” an official said.
Monju, located in Tsuruga, Fukui Prefecture, is a core facility in Japan’s nuclear fuel cycle policy because, if running properly, the reactor produces more plutonium than it consumes.
More than ¥1 trillion, mostly from state budgets, has been invested in Monju. But the 280,000-kw reactor has operated for only 250 days since it reached criticality, or a self-sustained nuclear fission chain reaction, for the first time in April 1994, due to a raft of problems, including maintenance flaws, a sodium leak and fire and attempted coverup.
In November 2015, the Nuclear Regulation Authority advised the government to replace the operator of Monju. The government is carrying out a thorough review of the Monju project, including the possibility of decommissioning the reactor.
The disposal of the mixed-oxide, or MOX, fuel used at Monju is another significant issue. The amount of MOX fuel, a blend of uranium and plutonium recycled from spent nuclear fuel, that needs to be disposed of is estimated at 21 tons, but Japan is not equipped to carry out its disposal.

One option is to consign the disposal to a foreign country and receive the return of uranium and plutonium after the processing, along with radioactive waste.
But the agency's cost estimate of ¥300 billion for decommissioning Monju does not include the expense of the overseas entrustment of MOX fuel disposal.
The agency aims to entrust France with the disposal of some 64 tons of MOX fuel that has been used at its Fugen advanced converter reactor, but no contract has been concluded. The Fugen reactor, also in Tsuruga, is slated to be decommissioned.
Spent MOX fuel contains larger amounts of highly toxic radioactive substances than spent uranium from conventional reactors.
The disposal of radioactive sodium and MOX fuel at Monju is emerging as an additional and difficult challenge for the government at a time when the final disposal site has not been decided for high-level radioactive waste from nuclear plants across Japan.

November 10, 2016

Tarpaulins to prevent stirring up radioactive substances

The crippled No. 1 reactor building is exposed at the Fukushima No. 1 nuclear power plant on Nov. 10 as Tokyo Electric Power Co. removed the last of the covers for the structure. (Eiji Hori)

Last cover removed from crippled reactor in Fukushima

http://www.asahi.com/ajw/articles/AJ201611100041.html

By KOHEI TOMIDA/ Staff Writer

The No. 1 reactor at the Fukushima No. 1 nuclear power plant is completely exposed for the first time in five years after the last of the temporary protective covers for the crippled structure was removed Nov. 10.
The next step will be to extract nuclear fuel inside the reactor building, which was wrecked by a hydrogen explosion in the early stages of the March 2011 nuclear disaster.
The covers were installed the following October as a temporary measure against the spread of radioactive substances after the triple meltdown triggered by the Great East Japan Earthquake and tsunami.
A large crane lifted off the 20-ton cover, the last of the 18 panels installed, around 6 a.m. on Nov. 10.
Plant operator Tokyo Electric Power Co. began removing the covers one by one in September.
The 392 fuel assemblies are stored in the spent nuclear fuel pool inside the building. Melted fuel also remains inside the reactor.
TEPCO will assess the state of the reactor building's interior in efforts to remove debris from the collapse of a roof over the spent nuclear fuel pool.
It will take precautions to prevent dust containing radioactive substances from being stirred up by **shrouding the reactor building with tarpaulins.**

November 16, 2016

Decommissioning: What cooperation?

TEPCO may struggle to find partners due to Fukushima decommissioning costs

http://mainichi.jp/english/articles/20161116/p2a/00m/0na/008000c

Naomi Hirose, president of Tokyo Electric Power Company Holdings Inc. (TEPCO), presented a proposal to reform the operator of the crippled Fukushima No. 1 Nuclear Power Plant to the Economy, Trade and Industry Ministry's expert panel on Nov. 15.
Under the proposal submitted by Hirose on the reform of TEPCO and issues related to the crippled Fukushima nuclear power plant, TEPCO is to collaborate with other power companies in the areas of nuclear power generation and energy transmission and distribution in an effort to boost its earning power. But if other major utilities were to work with TEPCO on a nuclear power project, questions would be raised about how to split risks such as decommissioning costs for the crippled Fukushima plant among companies concerned. Such being the case, TEPCO will likely have difficulty finding partners.
Hirose attended the closed-door expert committee meeting as an observer. Committee chairman Kunio Ito (specially-appointed professor at Hitotsubashi University) and a senior industry ministry official revealed the details of Hirose's reform proposal at a news conference after the panel meeting.
According to details revealed at the news conference, Hirose proposed to step up TEPCO's cooperation with other power companies on its nuclear power business including the areas of safety measures, joint technological development and overseas business operations. The industry ministry had already proposed at an expert panel meeting that TEPCO spin off its nuclear business into a subsidiary and collaborate with other utilities, among other moves. TEPCO is expected to incorporate these plans into the "New Comprehensive Special Business Plan" that is set to be revised early next year in line with discussions at expert panel meetings.
Under the current New Comprehensive Special Business Plan, TEPCO assumes reactivation of its Kashiwazaki-Kariwa Nuclear Power Plant as a source of earnings to be used to rebuild itself. But there are no prospects of the power plant being reactivated as the governor of Niigata Prefecture, which hosts the nuclear facility, is taking a cautious stance toward reactivation. The industry ministry wants to secure understanding of a plan to reactivate the nuclear power plant by improving the

creditworthiness of TEPCO's nuclear business through collaboration with other utilities. But because there is a possibility of other power companies being forced to shoulder the costs of decommissioning the crippled Fukushima plant, it remains unclear whether TEPCO will be able to cooperate with those utilities as envisioned.
A member of the expert panel was quoted as saying at the meeting, "A proper alliance cannot be formed unless ways of shutting off the risks (for possible alliance partners) are considered. Hirose also proposed that TEPCO work with other firms in the area of power generation and transmission, as well as jointly procure materials with other firms.
As for the costs of decommissioning the Fukushima No. 1 nuclear plant, which are expected to exceed the initial estimate by several trillion yen, and expenses for paying compensation to nuclear disaster victims, the expert panel confirmed plans for TEPCO to minimize financial burdens on the public through management efforts. An expert panel member was quoted as saying at the Nov. 15 meeting, "If TEPCO's liability is defined as limited, the general public will see the move as relief measures for TEPCO. We should carefully consider public opinion."

November 18, 2016

Removal of No.3 fuel rods delayed

TEPCO expects delay in fuel rod removal

http://www3.nhk.or.jp/nhkworld/en/news/20161118_33/

The operator of the Fukushima Daiichi nuclear plant is likely to begin an operation to place a cover over a damaged reactor building in January, after a 9-month delay.

Tokyo Electric Power Company, or TEPCO, reported the schedule to nuclear regulators on Friday. The metal cover must be in place before the utility can start removing nuclear fuel units from the No. 3 reactor's pool.

TEPCO was initially planning to start assembling the cover in April this year. But officials say it took more time than expected to decontaminate the site and install plates made of lead to block radiation.

TEPCO says workers will first spend about 6 months installing equipment to lift and transfer the fuel units, and then assemble the cover.

Officials say they can't forecast when the work will be complete, and that they may have to revise a plan to start removing the fuel units before April 2018.

The No. 3 reactor's fuel pool houses 556 spent and unused fuel assemblies.

November 21, 2016

NHK video: New option for radioactive water

http://www3.nhk.or.jp/nhkworld/en/news/videos/20161121161923683/

Let it evaporate (this idea has already been used after the accident at Three Mile Island)
although some critics say environmental consequences are unclear
Japan needs the help of the international community (US, France, Britain and Russia).

Fuel removal postponed at No.3 (566 fuel units)

Fuel removal unlikely by March 2018

http://www3.nhk.or.jp/nhkworld/en/news/20161121_24/

A government official has suggested that fuel removal from a reactor at the crippled Fukushima Daiichi nuclear plant will not start by March 2018, as planned.

566 nuclear fuel units remain in the No. 3 reactor's fuel pool. To reach their target period, plant operator Tokyo Electric Power Company must begin placing a cover over the damaged reactor building by this April.

It's now expected the cover installation will not start until January next year or later. It was determined that stronger measures are needed to protect workers from radiation exposure.

An official with the industry ministry overseeing reactor decommissioning inspected the plant on Monday. He said starting fuel removal within the next fiscal year is difficult.

Tokyo Electric says the cover installation has been slow, but the company will continue decommissioning work with safety as their highest priority.

November 24, 2016

TEPCO-Sellafield Ltd to cooperate "to benefit the world"

https://www.facebook.com/OfficialTEPCOen/

TEPCO Holdings-Sellafield Cooperation Earns Award Nomination: The agreement to share expertise and personnel between TEPCO Holdings and the UK's Sellafield Ltd., designed to support each other's decommissioning efforts and an example of using the Fukushima Daiichi experience to benefit the world, earned a nomination for a prestigious award. The British Business Awards, given by the British Chamber of Commerce in Japan, recognize excellence and innovation. The TEPCO Holdings-Sellafield partnership was nominated in the "UK-Japan Partnership" Category along with three others, and was the only one from the energy sector in that category. Although the award ultimately went to an educational partnership for high school students studying overseas, TEPCO Holdings was honored to have been nominated alongside these other leading organizations.
Nominees

https://www.bccjapan.com/…/2016-british-business-awards-al…/Winner
https://www.bccjapan.com/…/congratulations-2016-british-bu…/

November 25, 2016

New robot to check molten fuel

TEPCO to send robot into Fukushima reactor in Jan.

http://www3.nhk.or.jp/nhkworld/en/news/20161125_01/

The operator of the Fukushima Daiichi nuclear power plant says in January it plans to send an inspection robot into one of its crippled reactors to ascertain the status of the molten fuel.

The No.1 to 3 reactors experienced a meltdown after the March 2011 earthquake and tsunami. Some fuel in the No.2 reactor is believed to have melted and thought to have penetrated through its core, accumulating at the bottom of the containment vessel.

The locations and status of nuclear fuel have yet to be determined. These will have a significant impact on the process to remove it from the reactors, a key step toward decommissioning the plant.

The plant's operator, Tokyo Electric Power Company, initially hoped to put an inspection robot into the reactor in August last year.

But the operation was postponed twice. Broken concrete was blocking a pipe to be used as an entry point for the robot. A site workers plan to use for the mission had extremely high levels of radiation.

The utility says it has removed the obstacles and decontaminated the area enough to launch the inspection.

The company plans to create a hole in the lid of the pipe leading to the containment vessel next month to see if there is any problem with the route .The firm says that should it discover any new obstacle, it will mobilize another robot to fix the problem.

In January, engineers will maneuver the inspection robot through the pipe and into the containment vessel by remote control. The robot will film the interior of the vessel and gauge levels of radiation.

November 28, 2016

Fukushima disaster: 20 trillion yen...or more

Cost of Fukushima disaster expected to soar to ¥20 trillion

http://www.japantimes.co.jp/news/2016/11/28/national/cost-fukushima-disaster-expected-soar-%c2%a520-trillion/#.WDw2kX2Dmos

Kyodo

The overall cost of wrapping up the Fukushima nuclear disaster is now estimated at more than ¥20 trillion, nearly double the previous estimate, sources familiar with the matter said Monday.

The Ministry of Economy, Trade and Industry, which previously put the overall cost at ¥11 trillion, is considering passing on a portion of the costs, including for compensation and the decommissioning of the Fukushima No. 1 nuclear plant, to consumers via higher electricity prices, the sources said.
The aged, six-reactor plant, operated by Tokyo Electric Power Co. Holdings Inc., was plunged into a blackout by the March 2011 earthquake and subsequent tsunami, leading to three core meltdowns and the worst nuclear disaster since Chernobyl in 1986.
According to the new estimate, Tepco's compensation payments will rise to ¥8 trillion from ¥5.4 trillion and decontamination costs will double to around ¥5 trillion.
Trillions more will be needed to decommission the reactors and deal with radioactive water at the plant, on top of the ¥2 trillion earlier estimated, the sources said.
The ministry has been discussing reforming crisis-hit Tepco and is about to draft a plan for the utility based on the new estimate within this year.
Combined with the cost of building interim waste storage facilities, foreseen to remain at ¥1.1 trillion, the total cost is forecast to surpass ¥20 trillion, the sources said.
The government is studying the possibility of expanding a ¥9 trillion interest-free loan program for Tepco that was set up by issuing government bonds to cover compensation payments and decontamination costs in areas hit by the disaster.
It is expected to take up to 30 years to recover the ¥9 trillion through payments from Tepco and other big utilities.
The government also plans to recover the expected increase in compensation payments and decontamination expenses by raising charges for transmission line usage for new electricity retailers.
In principle, Tepco needs to secure funds on its own for decommissioning the plant. The government will manage the funds, which will be established using profits generated by the utility. But it is not clear if Tepco alone can shoulder the cost.

Fukushima plant decommissioning, compensation costs to almost double: gov't est.

http://mainichi.jp/english/articles/20161128/p2a/00m/0na/006000c

The Ministry of Economy, Trade and Industry estimates that the cost of decommissioning the disaster-stricken Fukushima No. 1 Nuclear Power Plant and compensation for disaster damage would top a total of 20 trillion yen -- almost twice the previous government forecast, it has been learned.

- 【Related】Fukushima nuclear plant decommissioning cost to surge
- 【Related】High school takes students to see Fukushima nuclear reactor decommissioning

As the government is planning to have major utilities and smaller power companies that newly entered into the power market after its liberalization shoulder part of the snowballing financial burdens, consumers are certain to face increased electricity bills. The ministry is set to draw a conclusion later this year possibly based on the estimate after continuing discussions at an expert panel on the management reform of plant operator Tokyo Electric Power Co. (TEPCO) and on measures to secure financial resources.
The government had previously estimated that a total of 11 trillion yen would be needed to cover the projects -- 5.4 trillion yen for nuclear damage compensation, 2.5 trillion yen for decontaminating areas affected by the nuclear disaster, 1.1 trillion yen for building interim storage facilities for radiation contaminated soil and 2 trillion yen for decommissioning reactors at the Fukushima No. 1 nuclear plant.
In the latest estimate, the compensation cost is expected to surge to roughly 8 trillion yen and the decontamination cost is estimated at somewhere around 4-5 trillion yen. It is also highly likely that the

decommissioning cost would spike by several trillion yen. The development cost for interim storage facilities remains unchanged.
The previous government estimate was calculated toward the end of 2013, but the coverage of nuclear damage compensation has since increased and decontamination efforts are taking longer than expected. The decommissioning cost has also expanded especially for work to salvage nuclear fuel debris from the 2011 meltdowns. The ministry had earlier projected that the yearly cost for these projects would reach hundreds of billions of yen from the current 80 billion yen.
The government had heretofore explained that: the compensation cost would be temporarily paid by the Nuclear Damage Compensation and Decommissioning Facilitation Corp. (NDF) before being covered by TEPCO and other major utilities; the decontamination cost would be covered by the government after it sells the TEPCO shares that it owns; revenue from the power resources development promotion tax would be used for the construction of interim storage facilities; and the reactor decommissioning cost would be secured by TEPCO.
The government is now looking into boosting the amount temporarily covered by the NDF, while tacking the snowballing compensation cost onto major utilities and new power providers that use power grids operated by existing power transmission companies. The power grid usage fees, which require government approval, are ultimately to be passed on to consumer electricity bills.
As it is highly likely that the proceeds from the sale of TEPCO shares are too small to cover the decontamination cost, the government is mulling demanding TEPCO and other utilities share the financial burden. In that case, the expenses may likely be passed onto electricity bills.
The government will consider establishing a system in which TEPCO accumulates funds through business streamlining efforts to cover the decommissioning cost. As it is widely deemed difficult to cover the cost only through management efforts, however, the expenses may likely be -- again -- tacked onto power bills.

December 4, 2016

Robot competition

Students test skills for robot missions inside Fukushima plant

http://mainichi.jp/english/articles/20161208/p2g/00m/0dm/080000c

By TERU OKUMURA/ Staff Writer
NARAHA, Fukushima Prefecture--A student contest for developing robots for decommissioning work at the crippled Fukushima No. 1 nuclear power plant was held here on Dec. 3 to nurture young people willing to tackle the decades-long undertaking.
In the plant, robots are being used instead of human workers because of the dangerous radiation levels.
A total of 15 teams from 13 colleges of technology throughout the country took part in the competition, named “The 1st Hairo Sozo Robocon” (The 1st robot contest to compete in creativity for reactor decommissioning).
It was organized by a council of teaching staff at colleges of technology and the education ministry.
“Decommissioning work may give you a negative impression. But it is the same as space development in that both of them challenge unknown fields. I think that the students will be interested in the work,” said Shigekazu Suzuki, associate professor of mechanical engineering at the National Institute of Technology, Fukushima College, a leading member of the council.
The students were challenged with robotic tasks such as delivering a piece of baggage to the 3.8-meter-high second floor or checking the state of a bumpy floor.

Their efforts to protect robots from radiation or technologies to operate them remotely were also evaluated. That reflects the reality at the Fukushima No. 1 plant that workers cannot enter some areas due to high radiation levels or robots may not operate properly there.
A team from the Osaka Prefecture University College of Technology was chosen for the top prize.
The contest was held at the Naraha Remote Technology Development Center of the Japan Atomic Energy Agency, an affiliate of the government.
About 40 robots have already been utilized at the plant. However, seven of these have been unable to return as they fell over or were caught between cracks.
Since the decommissioning work is expected to take up to 40 years, it is a major challenge to secure the necessary human resources and develop proper technologies.

Robot contest for scrapping Fukushima reactors

http://www3.nhk.or.jp/nhkworld/en/news/20161203_25/

More than a dozen groups of engineering students have competed in a robot contest to determine whether their models could be used to help decommission damaged reactors at the Fukushima Daiichi nuclear power plant.

Fifteen teams from 13 national institutes of technology took part in the competition in Naraha Town, Fukushima Prefecture, on Saturday.

It is the first-ever event to raise interest among young people in the decommissioning project. Experts estimate that it will take 4 decades to complete the dismantling work. The organizers included the science ministry.

Robots developed by the students took on the task of ascending and descending a steep stairway modelled after actual buildings housing the reactors. The robots also had to take a video of a high place.
The organizers limited working time to between 5 and 10 minutes after considering the effects of strong radiation on electrical devices. The participants in principle needed to operate their robots via cables as radio waves cannot penetrate the thick concrete walls surrounding the reactors.

A team from a Tokyo institute succeeded in taking a video of a high spot by using an extendable arm. One of the members said his team had considered the impact of radiation during the designing stage and had reduced the number of electrical parts to create a practical mechanism. He added the group will advance its research to contribute to the restoration of the area around Fukushima.

The organizers hope interested companies will launch joint research projects using the students' designs.

December 21, 2016

Fukushima clean-up and rigged bids

Fukushima's ¥8 trillion cleanup leaves foreign firms in the cold

http://www.japantimes.co.jp/news/2016/12/21/business/fukushimas-%c2%a58-trillion-cleanup-leaves-foreign-firms-cold/#.WFp1X32Dmif

by Stephen Stapczynski

Bloomberg

Cleaning up the Fukushima nuclear plant — a task predicted to cost 86 times the amount earmarked for decommissioning Japan's first commercial reactor — is the mother of all salvage jobs. Still, foreign firms with decades of experience are seeing little of the spoils.

Safely dismantling the Japanese power plant, wrecked by the 2011 earthquake and tsunami, will cost about ¥8 trillion ($70 billion), the Ministry of Economy, Trade and Industry said Dec. 9, quadrupling the previous estimate. While a contract to help clean up the facility would be a windfall for any firm with specialized technology, the lion's share of the work has gone to local companies that designed and built most of Japan's atomic infrastructure.

The bidding process for Fukushima contracts should be more open to foreigners as Japan has never finished decommissioning a commercial nuclear plant, let alone one that experienced a triple meltdown, according to Lake Barrett, an independent adviser at Japan's International Research Institute for Nuclear Decommissioning. While the Fukushima cleanup is unlike any nuclear accident in history, foreign firms that have experience decommissioning regular facilities could provide much-needed support, according to Barrett, and even the plant's operator, Tokyo Electric Power Co. Holdings Inc.

'Cultural Resistance'

"Internationally, there is a lot more decontamination and decommissioning knowledge than you have in Japan," Barrett, a former official at the U.S. Nuclear Regulatory Commission, said in an interview in Tokyo. "I hope the Japanese contracting system improves to get this job done safely. There is this cultural resistance — it is almost like there is an isolated nuclear village still."

An opaque bidding process plays to the heart of criticisms put forward by independent investigators, who said in a 2012 report that collusion between the government, regulators and the plant's operator contributed to the scale of the disaster.

Of 44 subsidized projects publicly awarded by the trade and economy ministry since 2014, about 80 percent went to the International Research Institute for Nuclear Decommissioning. The group, known as IRID, was established in the wake of the Fukushima disaster and is comprised entirely of Japanese corporations, according to the ministry's website.

Japan's trade and industry ministry awarded funds directly to only two foreign firms during the same period. Many of the contracts had only one or two bidders.

Of about 70 contracts awarded since the March 2011 disaster, nine have gone to foreign companies, according to an official in the ministry's Agency of Natural Resources and Energy who asked not be named citing internal policy.

To provide opportunities for foreign companies, the ministry has created an English website for bids and also provides English information sessions to explain the contracts, the official said.

Toshiba, Hitachi

IRID's contracts are given to its members, including Toshiba Corp., Hitachi Ltd. and Mitsubishi Heavy Industries Ltd., which have partnerships and joint ventures with foreign firms, spokesman Yoshio Haruyama said by phone. While it doesn't directly contract work to companies overseas, IRID taps foreign experts as advisers and participates in international collaborative projects, he said.

Mitsubishi Heavy has about five or six contracts through IRID, but can't share how many partnerships it has with foreign firms, spokesman Shimon Ikeya said by phone. Hitachi has sub-contracts with foreign suppliers related to the Fukushima cleanup, but can't provide details about these agreements because they aren't public, a spokesperson said by e-mail.
As of March, IRID had about ¥30 billion worth of ongoing contracts primarily related to research and development of fuel removal and waste treatment. IRID, which aims to "gather knowledge and ideas from around the world" for the purpose of nuclear decommissioning, doesn't disclose how much of their money ultimately goes to foreign businesses, according to its spokesman. Barrett, its adviser, said he thinks it's "very low," but should ideally be 5 percent to 10 percent.

'Nuclear Village'

Japan's biggest nuclear disaster isn't void of foreign technology. Toshiba, which owns Pennsylvania-based Westinghouse Electric Co., and Hitachi, which has a joint venture with General Electric Co., are tapping American expertise. A giant crane and pulley system supplied by Toshiba to remove spent fuel from the wrecked reactors employs technology developed by Westinghouse.
"We bring in knowledge from foreign companies, organizations and specialists in order to safely decommission the reactors," Tatsuhiro Yamagishi, spokesman for Tepco, said by e-mail. While the company can't say the exact number of foreign firms involved in the Fukushima cleanup, companies including Paris-based Areva SA, California-based Kurion Inc. and Massachusetts-based Endeavor Robotics are engaged in work at the site, according to Yamagishi.
However, foreign firms independently securing contracts is still a tall order.
"When it comes to Japan's nuclear industry, the bidding system is completely unclear," Hiroaki Koide, a former assistant professor at Kyoto University Research Reactor Institute, said in an e-mail. "The system is designed to strengthen the profits of Japan's nuclear village," he added, referring to the alliance of pro-nuclear politicians, bureaucrats and power companies that promote reactors.
Tepco's annual cost to decommission its Fukushima plant may blow out to several hundred billion yen a year, up from the current estimate of ¥80 billion, the trade and industry ministry said in October. As of June, almost ¥1 trillion has been allocated for decommissioning and treating water at Fukushima, according to Tepco's Yamagishi.

'Ripe for Corruption'

With that much money at stake, Japan has become ground zero for a plethora of companies looking to benefit from the cleanup work. The structure of Japan's nuclear industry and the closed procurement preferred by the utilities that operate atomic plants means that the most lucrative opportunities for foreign companies are in the area of subcontracting, according to a report by the EU-Japan Centre for Industrial Cooperation released in March.
"Foreign firms have long argued that the Japanese bidding process is one that is ripe for corruption due to a lack of openness and transparency," Daniel Aldrich, professor and director of the security and resilience studies program at Northeastern University in Boston, said in an e-mail. For nuclear decommissioning "there is even less clarity and transparency due to security and proliferation concerns," he said.

Rigging Bids

The Japan Fair Trade Commission raided the offices of five companies last year in relation to rigged bids for maintenance contracts from Tepco, according to Jiji Press. Eleven road-paving companies were fined in September on projects to repair roads following the March 2011 earthquake and tsunami, Jiji reported.
Andrew DeWit, a political economy professor at Rikkyo University in Tokyo, agrees that the contract-awarding process isn't transparent. A lot of foreign companies seek Japanese partners to better their chances, he said.

Purolite Corp., a closely held water purifying company, spent millions of dollars developing and testing a system that could be used to treat radioactive water at Fukushima. Pennsylvania-based Purolite partnered with Hitachi to help win a contract to use its technology at the wrecked facility.
Those plans didn't pan out. Purolite is suing Hitachi in New York and Tokyo, alleging that Hitachi is using its technology at Fukushima in breach of agreements made in 2011, shutting it out of more than $1 billion in contracts, according to court documents filed in September.
Hitachi doesn't comment on ongoing legal matters, a spokesperson said by e-mail.
"With a smaller pool of competitors, firms can expand their profit margins," said Northeastern University's Aldrich. "There are French and Russian firms that have the technical expertise to participate in nuclear decommissioning processes, but it is unclear if they will be able to compete on a level playing field with Japanese firms, which have far more experience with Japanese regulations and expectations."

December 23, 2016

No.3 fuel retrieval postponed

Fuel removal at Fukushima reactor again faces delay

http://www.asahi.com/ajw/articles/AJ201612230043.html

Steel frames are transported at the Fukushima No. 1 nuclear power plant on Dec. 20 to prepare for work to retrieve spent nuclear fuel from the storage pool of the damaged No. 3 reactor building. (Pool)

Work to retrieve spent nuclear fuel in the No. 3 reactor building storage pool of the crippled Fukushima No. 1 nuclear power plant will again be postponed due to a delay in clearing radioactive debris at the site.

TEPCO planned to begin removing 566 spent nuclear fuel assemblies in the storage pool in January 2018. However, the government and the plant operator, Tokyo Electric Power Co., decided on the postponement, sources said on Dec. 22. They will decide on a new timetable in a few weeks.
The work was initially scheduled for fiscal 2015, but had been pushed back because of high radiation readings in and around the No. 3 reactor building. The building was heavily damaged by a hydrogen explosion in the days following the disaster, triggered by the 2011 Great East Japan Earthquake and tsunami.
TEPCO had attempted to lower radiation levels by clearing the radioactive debris remaining at the site. But the clearing work took longer than expected due to contamination being more widespread than previously thought, forcing TEPCO and the government to again put off the retrieval.
Radiation levels have now dropped as almost all of wreckage at the site has been cleared, TEPCO said. The government and TEPCO have said fuel retrieval at the No. 1 and No. 2 reactor buildings will start in fiscal 2020 or later.

January 10, 2017

Decommissioning costs will probably continue to grow

News Navigator: Why are costs for dealing with Fukushima disaster growing?

http://mainichi.jp/english/articles/20170110/p2a/00m/0na/011000c

The government estimate of the overall costs for handling the aftermath of the Fukushima No. 1 Nuclear Power Plant has grown considerably, with a previous estimate of 11 trillion yen updated to 21.5 trillion yen at the end of last year, the second time the estimate has received a large hike. The Mainichi answers common questions readers may have about the growing costs.
Question: What is the breakdown of the cost increases?
Answer: As the decommissioning schedule of the Fukushima reactors has proceeded, and with the removal of the melted nuclear fuel debris set to possibly begin in 2021, the earlier estimate of 2 trillion yen for decommissioning costs was seen as insufficient and has been newly estimated at 8 trillion yen. Expected compensation payments have risen from 5.4 trillion yen to 7.9 trillion yen as damage to commercial, industrial and agricultural businesses from the disaster has lingered. Costs for decontamination work are estimated to increase from 2.5 trillion yen to 4 trillion yen due to higher personnel and materials costs. Mid-term storage sites for contaminated material are to grow in cost from 1.1 trillion yen to 1.6 trillion yen due to factors including safety measures during transport.
Q: Will the costs continue to increase?
A: The location and amount of the nuclear fuel debris are unknown, and the method of its removal is undecided. The new 8 trillion yen figure is just based on the costs of decommissioning the Three Mile Island nuclear plant that experienced an accident in the United States in 1979, and so costs may continue to grow. (Answers by Daisuke Oka, Business News Department)

All under control, says TEPCO

Video: "The current situation at Fukushima Daiichi NPS"
-From 3.11 toward the future- (ver, Jan. 2017)

http://www.tepco.co.jp/en/decommision/index-e.html

Fukushima Daiichi Nuclear Power Station was attacked by a huge tsunami caused by Tohoku Pacific Ocean earthquake on March 11 2011.

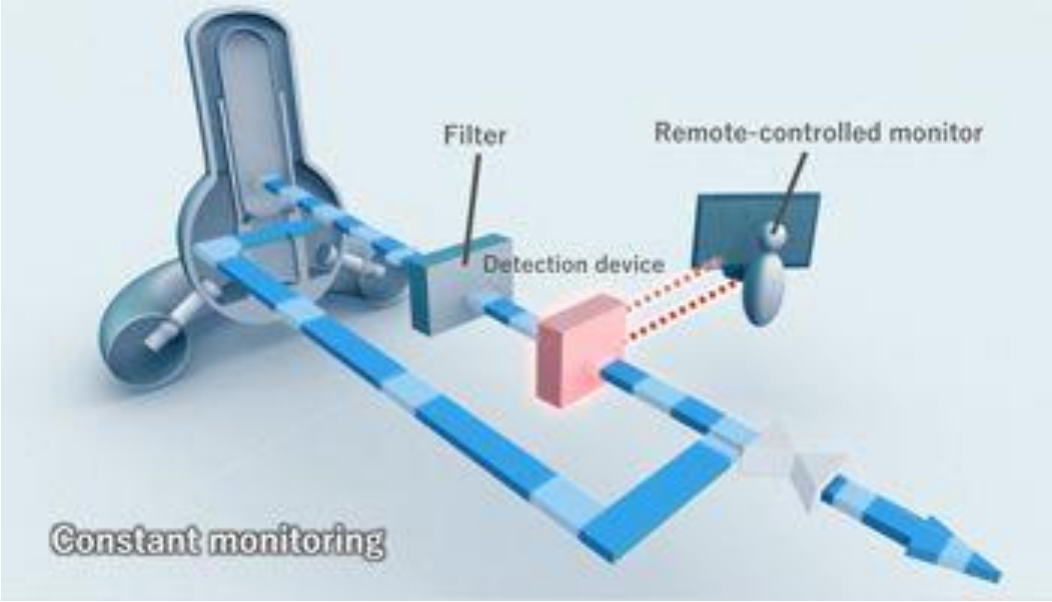
We would like to show you the latest situation of Fukushima Daiichi, looking back the time of the accident.
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=o6iw41m6&catid=61795

See also this previous (July 13, 2016) video from TEPCO:

Recriticality cannot be completely excluded

Preventing Recriticality in Fuel Debris at Fukushima Daiichi Nuclear Power Station

http://www.tepco.co.jp/en/decommision/index-e.html



This video will explain the conditions of the fuel retained in the reactors of Units 1-3 at Fukushima Daiichi Nuclear Power Station, and TEPCO's measures to prevent recriticality-return to a point at which a nuclear reaction becomes self-sustaining- in the fuel debris there.

January 27, 2017

Camera in No.2 containment vessel working again

TEPCO reinserts camera in Fukushima reactor

https://www3.nhk.or.jp/nhkworld/en/news/20170126_31/

TEPCO, the operator of the damaged Fukushima Daiichi nuclear plant, has again begun using a camera probe inside the containment vessel of the No. 2 reactor.

Taking pictures of the molten fuel inside is regarded as an important step towards decommissioning the reactors that melted down.

On Tuesday, workers at the plant tried to insert a camera into a pipe leading into the containment vessel.

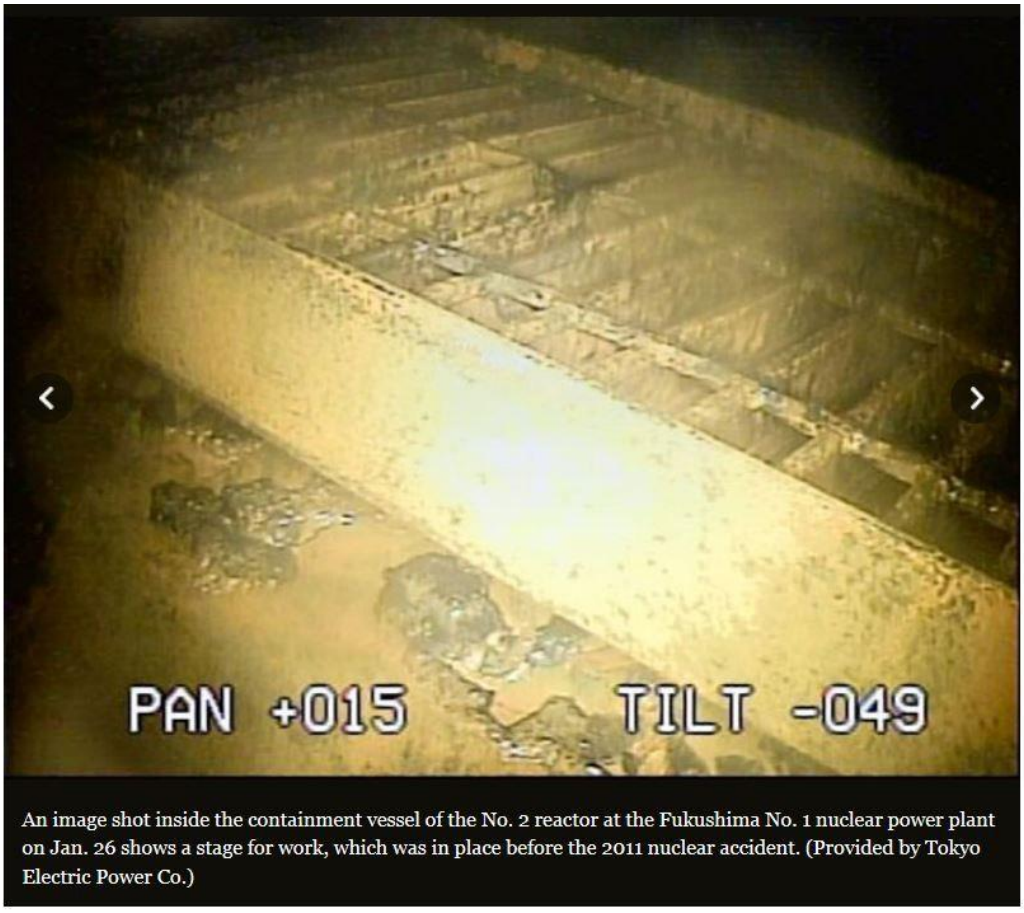
But the camera got stuck in the pipe's opening. The rubber, which had shrunk due to cold, blocked it.

In a second attempt on Thursday, workers tried to push the camera into the pipe while warming the rubber with thermal material. They were successful.

Footage from the camera shows a black substance adhering to the surface of metal rails in the vessel. The rails will be used as tracks for a robot to do a survey in February.

TEPCO expects the camera may capture footage of molten fuel for the first time since the 2011 meltdown.

Inside reactor No.2



An image shot inside the containment vessel of the No. 2 reactor at the Fukushima No. 1 nuclear power plant on Jan. 26 shows a stage for work, which was in place before the 2011 nuclear accident. (Provided by Tokyo Electric Power Co.)

TEPCO starts full survey inside Fukushima No. 2 reactor vessel
http://www.asahi.com/ajw/articles/AJ201701270073.html

Tokyo Electric Power Co. sent a camera into the containment vessel of the No. 2 reactor at the Fukushima No. 1 nuclear power plant on Jan. 26 as it started a full-scale survey of the damage inside. The probe is being conducted in advance of plans to send a robot into the heavily contaminated vessel in February to determine the locations of the melted nuclear fuel.
Nearly six years have passed since the Great East Japan Earthquake and tsunami in March 2011 triggered the Fukushima nuclear accident. However, the precise locations of the melted fuel inside the No. 2 reactor are unknown.
If those sites are confirmed, they will serve as valuable data in decommissioning the reactor.
On Jan. 26, TEPCO inserted a camera-installed pipe into the containment vessel through a hole that had been made for the survey robot "Sasori" to pass through.
The radiation level around the hole was eight sieverts per hour, a deadly exposure level for humans. Workers were forced to perform their tasks while taking cover behind a wall, which was located about two meters from the hole.
According to TEPCO, video footage taken by the camera inside the containment vessel showed that there were no obstacles around the area where Sasori is expected to pass through.
Next week, TEPCO plans to send the camera probe deeper and shoot images of the area just below the nuclear reactor. Utility officials said there is a possibility that melted fuel can be seen.
If data on the locations and conditions of the melted nuclear fuel are obtained, TEPCO and the International Research Institute for Nuclear Decommissioning (IRID) will utilize them when they study the removal method for the fuel, expected to be decided in fiscal 2018 at the earliest.
TEPCO hopes that it will start to take out the melted fuel as early as 2021.
To date, the utility has examined the inside of the containment vessel of the No. 2 reactor with an industrial endoscope three times. However, it has been unsuccessful in confirming the locations of the melted fuel.
(This article was written by Kohei Tomida and Takashi Sugimoto.)

No.3: Fuel removal to be delayed till late 2018

Fuel removal work pushed back

https://www3.nhk.or.jp/nhkworld/en/news/20170126_30/

The operator of the Fukushima Daiichi nuclear plant has suggested removing fuel from one of the damaged reactors will be delayed until around late 2018. That's about half a year later than scheduled.

A total of 566 spent and unused fuel assemblies remain in the fuel pool of the No. 3 reactor.

TEPCO only started to install a cover for devices to remove the fuel units this month, 9 months behind schedule.

TEPCO officials say it took more time than expected to decontaminate the site and install lead plates to block radiation.

The Chief Decommissioning Officer Naohiro Masuda told reporters on Thursday that fuel removal will not start by the end of March this year, as planned.

He explained that workers will first need to install devices to lift and transfer the fuel units, and then assemble a cover for the devices. TEPCO officials say they can't forecast when the work will be complete.

Masuda said the company is making safety the first priority but he hopes, by devising ways to work efficiently, it can start removing fuel as soon as possible.

This is the second time the utility has announced a delay in its removal schedule.

see also : http://www.japantimes.co.jp/news/2017/01/27/national/fukushima-reactor-3-fuel-removal-pool-postponed/#.WIzTBfKDmos

January 30, 2017

Melted fuel possibly found

Possible fuel debris located in reactor

https://www3.nhk.or.jp/nhkworld/en/news/20170130_23/

NHK has learned operators of the crippled Fukushima Daiichi nuclear plant believe they may have located molten fuel inside one of the plant's reactors.

If confirmed, this would be the first time since the 2011 nuclear disaster that they have managed to determine the exact location of the debris.

The operator of the plant, Tokyo Electric Power Company, began sending a remote controlled camera into the containment vessel of the Number 2 reactor last week.

On Monday, it transmitted images of a black mass on the floor under the reactor core.

The operator suspects it is fuel debris, a mixture of molten fuel and broken interior parts.
It plans to send in a robot equipped with a radiation-measuring device early next month to get a better idea.

TEPCO plans to hold a news conference on Monday to explain more about the finding.

See also :
January 30, 2017

Melted fuel possibly found inside of crippled Fukushima reactor

http://mainichi.jp/english/articles/20170130/p2a/00m/0na/022000c

A survey on the inside of the No. 2 reactor at the tsunami-ravaged Fukushima No. 1 Nuclear Power Plant has shown a black object, which its operator says could be melted fuel, sources close to the case said.

- 【Related】TEPCO begins taking video inside Fukushima No. 1 nuke plant reactor

Experts at Tokyo Electric Power Co. (TEPCO), the operator of the crippled power station, are analyzing the object.
TEPCO conducted the survey on the inside of the reactor by inserting a camera attached to the tip of a pole inside on Jan. 30.

The survey shows the black object near a grating, which is used as a foothold for plant workers, just below the reactor's pressure vessel.
Following the outcome of the survey, TEPCO plans to send a remotely controlled robot into the reactor building to get a closer look at conditions, beginning in February.
At the time of the outbreak of the nuclear crisis, there were 548 fuel units inside the No. 2 reactor, according to company officials.

TEPCO may have located melted fuel for 1st time at Fukushima plant

http://www.asahi.com/ajw/articles/AJ201701300058.html

Tokyo Electric Power Co. said Jan. 30 it may have finally pinpointed the location of melted fuel at the Fukushima No. 1 nuclear plant, nearly six years after the triple meltdown unfolded there.
If confirmation is made, it would represent a breakthrough in the daunting task of decommissioning the stricken nuclear plant.
A remote-controlled camera fitted on a long pipe detected black lumps on grating in the lower part of the containment vessel of the No. 2 reactor at the plant early on Jan. 30, TEPCO said.
The wire-mesh grating is located below the pressure vessel of the reactor. The lumps were not there before the Great East Japan Earthquake and tsunami on March 11, 2011, caused the nuclear disaster, according to TEPCO.
The utility plans to determine whether the lump is melted fuel based on images and radiation levels taken by an investigative robot and other data. The robot, called “Sasori” (scorpion) and fitted with two cameras, a dosimeter and a temperature gauge, will be sent into the No. 2 reactor containment vessel next month.
High radiation levels have hampered efforts at the nuclear plant to determine the condition and location of melted nuclear fuel.
TEPCO tried--and failed--three times to locate melted fuel using an industrial endoscope at the No. 2 reactor.
The latest investigation inside the No. 2 reactor began on Jan. 26 to locate the melted fuel.
The company is preparing to devise a method to retrieve the melted fuel in fiscal 2018 as part of the decommissioning work.

Nuclear fuel debris that penetrated reactor pressure vessel possibly found at Fukushima No. 1

http://www.japantimes.co.jp/news/2017/01/30/national/fuel-debris-possibly-found-no-2-reactor-fukushima-nuclear-plant-nhk/#.WJCED_KDmos

by Kazuaki Nagata

Tepco on Monday found what may be melted nuclear fuel debris that penetrated the reactor 2 pressure vessel at the Fukushima No. 1 plant.
Tokyo Electric Power Company Holdings Inc. said more analysis and investigation is needed to confirm that the black lumps detected in the reactor’s containment vessel are indeed fuel debris.
The steel pressure vessel houses the nuclear fuel rods and is set up inside the surrounding containment vessel.

“At this point, it’s difficult to clearly identify what they are,” said Yuichi Okamura, general manager of Tepco’s nuclear power and plant siting division, during an evening news conference at the utility’s Tokyo headquarters.
Video footage from Monday’s probe showed black lumps that looked like something that had melted and then congealed, sticking to parts of a steel grating area at the base of the containment vessel.
The material could be melted paint, cable covers or pipe wrappings, Okamura said.
Still, this is the first time Tepco has detected anything in any of the facility’s three wrecked reactors that might be melted fuel rods since the outbreak of the crisis in March 2011. Okamura described the finding as “valuable information.”
The location of the debris and what form it is in are critical to eventually recovering the fuel.
Tepco plans next month to send in a remote-controlled robot equipped with a thermometer and dosimeter. Analyzing the temperature and radiation level will help identify whether the lumps are fuel debris, Okamura said.
The fuel melted after the March 11, 2011, earthquake and tsunami knocked out Fukushima No. 1’s power supply, including the vital cooling functions.
It is believed that reactor No. 2’s fuel rods melted and penetrated the bottom of the 20-cm-thick pressure vessel and fell in to the containment vessel.
Tepco has been conducting an investigation to check the interior of the containment vessel since last week.
In a previous try, workers inserted a rod equipped with a small camera as a precursor to sending in the remote-controlled robot.
The first attempt turned up nothing of note, but the utility then tried a longer rod — 10.5 meters long — on Monday that could capture images of the area beneath the pressure vessel.
The video footage also showed that water droplets were falling, which Tepco said must be cooling water being injected into the damaged pressure vessel.
Reactor 2 is one of three reactors, including 1 and 3, that experienced fuel meltdowns.

January 31, 2017

Breakthrough?

Possible Nuclear Fuel Find Raises Hopes of a Fukushima Plant Breakthrough

https://www.theguardian.com/environment/2017/jan/31/possible-nuclear-fuel-find-fukushima-plant

Operator says it has seen what may be fuel debris beneath badly damaged No 2 reactor, destroyed six years ago in triple meltdown

Justin McCurry in Tokyo, The Guardian
Hopes have been raised for a breakthrough in the decommissioning of the wrecked Fukushima Daiichi nuclear plant after its operator said it may have discovered melted fuel beneath a reactor, almost six years after the plant suffered a triple meltdown.
Tokyo Electric Power (Tepco) said on Monday that a remote camera appeared to have found the debris beneath the badly damaged No 2 reactor, where radiation levels remain dangerously high.
Locating the fuel is the first step towards removing it.

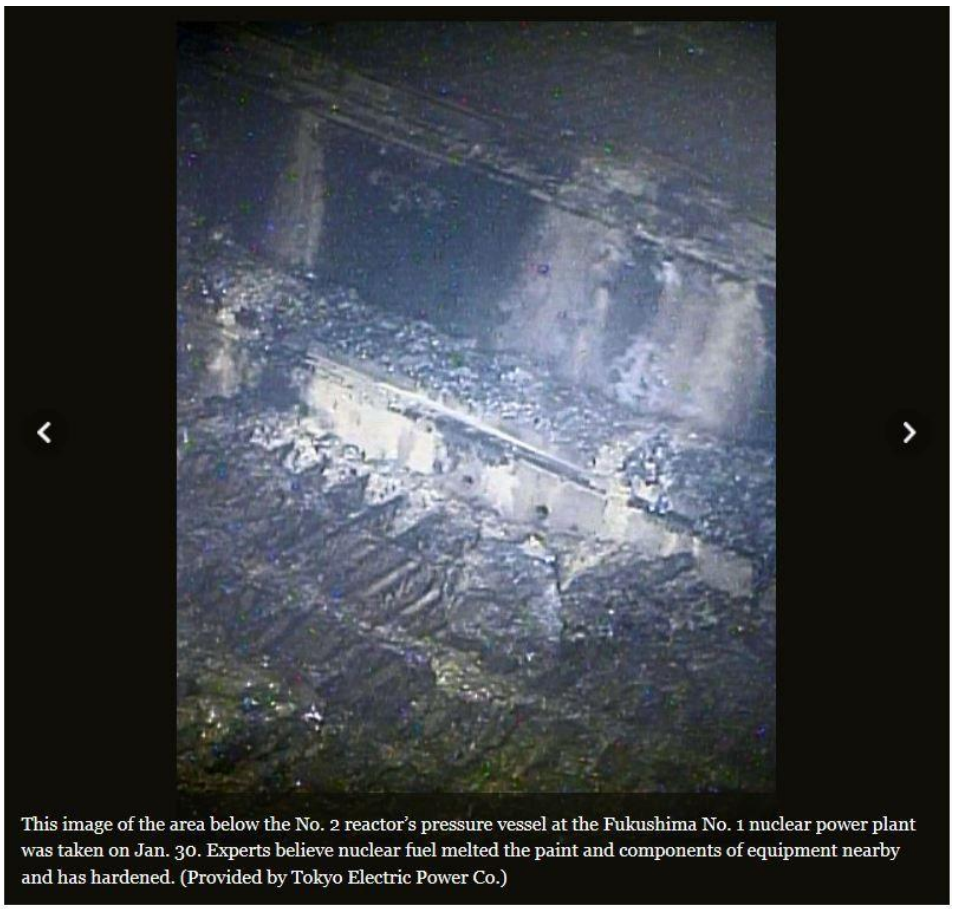
The operator said more analysis would be needed before it could confirm that the images were of melted uranium fuel rods, but confirmed that the lumps were not there before Fukushima Daiichi was hit by a powerful earthquake and tsunami on 11 March 2011.
The tsunami, triggered by a 9.0-magnitude quake, killed more than 18,500 people along the coast of north-east Japan and destroyed the backup power supply at Fukushima Daiichi, triggering the world's worst nuclear accident since Chernobyl 25 years earlier.
Meltdowns in three of the plant's six reactors forced about 160,000 people to evacuate and sent plumes of radiation across the Fukushima region. Many of the evacuees are unlikely to return home.
If Tepco can confirm that the black mass comprises melted fuel, it would represent a significant breakthrough in a recovery effort that has been hit by mishaps, the buildup of huge quantities of contaminated water, and soaring costs.
"This is a big step forward as we have got some precious data for the decommissioning process, including removing the fuel debris," a Tepco official said.
Using a remotely controlled camera attached to the end of a 10.5-metrelong telescopic arm, Tepco technicians located black lumps on wire-mesh grating just below the reactor's pressure vessel, local media reported.
The company plans to send a scorpion-like robot equipped with cameras, radiation measuring equipment and a temperature gauge into the No 2 reactor containment vessel next month, according to the Asahi Shimbun.
Three previous attempts to use robots to locate melted fuel inside the same reactor ended in failure when the devices were rendered useless by radiation.
Developing the means to remove the fuel – a task Tepco has said will become easier once it can gauge its condition – would be the biggest step forward in the mission to clean up Fukushima Daiichi since the removal of hundreds of spent fuel rods from a damaged reactor building in late 2013.
The delicate, potentially dangerous task of decommissioning the plant has barely begun, however.
Japanese media said last week that plans to remove spent fuel from the No 3 reactor building had been delayed, while decommissioning the entire plant was expected to take at least 40 years.
In December, the government said the estimated cost of decommissioning the plant and decontaminating the surrounding area, as well as paying compensation and storing radioactive waste, had risen to 21.5 trillion yen ($187bn), nearly double an estimate released in 2013.
A government committee estimated that 2.4 trillion yen of the total cost would be passed on to consumers through higher electricity bills.

"Far worse than previously thought"

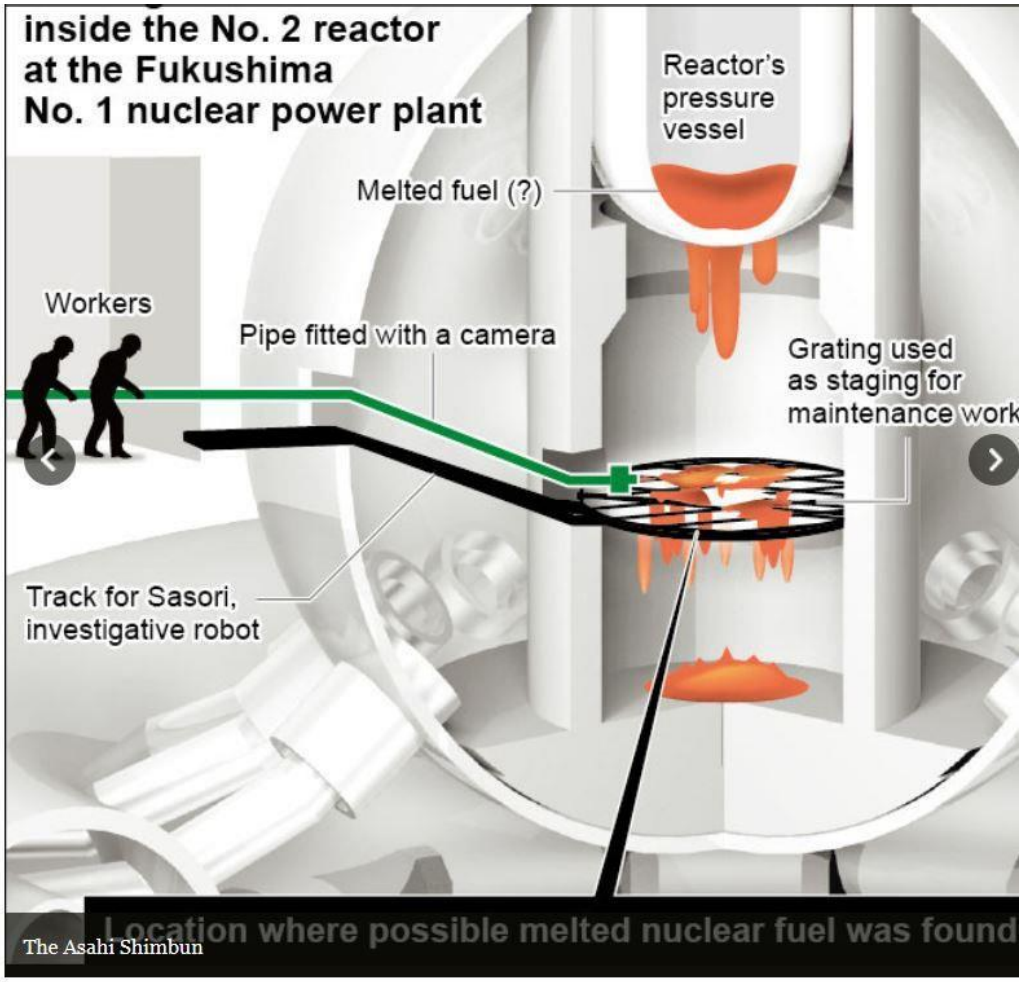
Images indicate bigger challenge for TEPCO at Fukushima plant

http://www.asahi.com/ajw/articles/AJ201701310073.html

By MASANOBU HIGASHIYAMA/ Staff Writer
A video taken on Jan. 30 shows the bottom of the No. 2 reactor's pressure vessel at the Fukushima No. 1 nuclear power plant. Water used to cool the nuclear fuel is dripping, and possible melted fuel is seen strewn on grating for maintenance work. (Provided by Tokyo Electric Power Co.)



This image of the area below the No. 2 reactor's pressure vessel at the Fukushima No. 1 nuclear power plant was taken on Jan. 30. Experts believe nuclear fuel melted the paint and components of equipment nearby and has hardened. (Provided by Tokyo Electric Power Co.)



If confirmed, the first images of melted nuclear fuel at the Fukushima No. 1 nuclear plant show that Tokyo Electric Power Co. will have a much more difficult time decommissioning the battered facility.
The condition of what is believed to be melted fuel inside the No. 2 reactor at the plant appears far worse than previously thought.
Before the pictures were taken by a remote-controlled video camera on Jan. 30, TEPCO presumed that most of the nuclear fuel at the No. 2 reactor had remained within the reactor's pressure vessel. That presumption was based on findings of a study conducted last year involving cosmic rays.
As a result, TEPCO did not expect the camera to detect possible nuclear fuel debris below the pressure vessel.
But the images showed black lumps scattered on a wire-mesh grating in the lower part of the containment vessel, which encloses the pressure vessel. This indicates that the fuel melted through bottom of the pressure vessel, spilled through the grating and fell on the floor of the containment vessel.
The grating, which was used by maintenance workers before the disaster, was partially bent.
The images could show only part of the melted fuel in the No. 2 reactor. And there is still no indication on how widespread the black lumps were strewn, their volume and state.
TEPCO and government authorities in fiscal 2018 plan to decide on a method to retrieve the melted fuel from each of the three crippled reactors and start the removal work in 2021.
But a number questions remain unanswered, such as how to reduce workers' radiation exposure, where the removed fuel will be kept, and when it will be disposed of.
The pictures raise another question: How will workers cut out the wire-mesh grating embedded with lumps of melted fuel?
The images were the first of possible nuclear fuel debris at the nuclear plant since the Great East Japan Earthquake and tsunami caused the triple meltdown there in March 2011.
High radiation levels have prevented workers from entering the No. 2 reactor, as well as the No. 1 and No. 3 reactors at the plant.
A number of problems have hampered investigations by robots into the location of melted fuel at the No. 1 and No. 3 reactors.

Footage points to difficulty in removing possible melted fuel at Fukushima plant

http://mainichi.jp/english/articles/20170131/p2a/00m/0na/007000c

The footage released on Jan. 30 by Tokyo Electric Power Co. (TEPCO) showing what could be melted fuel inside the No. 2 reactor at the disaster-stricken Fukushima No. 1 Nuclear Power Plant has highlighted the difficulty of salvaging the object, which is apparently stuck to footholds and other equipment at the facility.

- 【Related】TEPCO begins taking video inside Fukushima No. 1 nuke plant reactor
- 【Related】Melted fuel possibly found inside of crippled Fukushima reactor

TEPCO took the footage as part of its in-house probe into the No. 2 reactor and found that black and brown sediments -- possible melted fuel -- are stuck inside the reactor's containment vessel over an extensive area.
"If what was captured in the footage was melted fuel, that would provide a major step forward toward trying our hand at unprecedented decommissioning work," said Yoshiyuki Ishizaki, head of TEPCO's Fukushima Revitalization Headquarters, during a press conference in the city of Fukushima on Jan. 30.
"The finding may provide a major clue to future work to retrieve the object," he added.
At the time of the March 2011 meltdowns at the plant, there were 548 nuclear fuel rods totaling some 164 metric tons inside the No. 2 reactor, but they apparently melted down after the loss of power sources for the core cooling system, with part of the melted fuel penetrating through the pressure

vessel before cooling down at the bottom of the containment vessel. The temperature of the reactor core topped 2,000 degrees Celsius at the time of the accident, melting metals including nuclear fuel inside the reactor.
The melted fuel has since come in contact with underground water flowing from the mountain side, generating radioactively contaminated water every day. In order to dismantle the reactor, it is necessary to take out the melted fuel, but high radiation levels inside the reactor had hampered work to locate the melted debris.
On Jan. 30, apart from the footage, TEPCO also released 11 pictures taken inside the No. 2 reactor. The images show the sediments in question stuck to metal grate footholds and water is dripping from the ceiling. Further analysis of those images may provide information on the current status of the disaster and positional clues to decommissioning work.
The in-house probe, however, has only focused on the No. 2 reactor, and there is no prospect of similar probes into the No. 1 and No. 3 reactors starting anytime soon as they were severely damaged by hydrogen explosions following the 2011 meltdowns.
In April 2015, TEPCO introduced a remote-controlled robot into the No. 1 reactor by way of a through hole in its containment vessel, but the device failed to locate melted fuel inside due to high radiation levels. While the utility is planning to send a different type of robot into the No. 1 reactor this coming spring, it would be difficult to carry out a survey similar to that conducted at the No. 2 reactor, as radiation levels are high around the through hole in the No. 1 reactor's containment vessel, from which a device could access to right below the No. 1 reactor.
The No. 3 reactor, meanwhile, holds roughly 6.5-meter-deep contaminated water inside its containment vessel, a far larger volume than that accumulated at the No. 1 and No. 2 reactors. TEPCO has thus been developing a robot that can wade through water.

NHK Video: Fukushima Debris analysis

Fukushima Debris Analysis

https://www3.nhk.or.jp/nhkworld/nhknewsline/backstories/20170131/

The operator of the crippled nuclear plant in Fukushima has released photos taken inside a reactor building.
The utility believes it may have located molten fuel within the plant.
If confirmed, this would be the first time it's managed to capture footage of the fuel since the 2011 nuclear disaster.
NHK World's science correspondent Kenichiro Okamoto has been following events at Fukushima Daiichi since the disaster. He explains what the news could mean.
Okamoto: The discovery is potentially a big deal. If it turns out that officials have photographed molten fuel, it would be an important step in the decommissioning process.
They've spent years looking for the fuel and if they've found it, they can start to come up with a plan for the plant.
Here's what we already know. There's probably a lot of molten fuel at the bottom of the reactor. Images from last year told us that.
But we didn't know how much fuel, if any, was further down in the reactor's containment vessel. The point of the vessel is to stop radiative materials from leaking out.
Monday's probe showed deposits on a metal grate within the containment vessel under the reactor core. If that turns out to be molten fuel, it would be the first they've found since the 2011 disaster.
It would mean fuel mixed with debris penetrated the reactor and fell into the containment vessel underneath.

The cleanup process could be sped up, depending on how much fuel has leaked out. At the moment, we still don't know.
The government and TEPCO plan to send in a robot equipped with a radiation-measuring device early next month to make an assessment.
Here's the schedule the government wants to follow.
It intends to draft a plan by this summer on how to remove the debris from all 3 reactors.
It wants to finalize the details -- including a decision on which reactor to work on first -- by the first half of fiscal 2018. And it wants to begin actually removing the debris by 2021.
It says the whole process could take up to 40 years.

See previous video: Challenges of decommissioning

https://www3.nhk.or.jp/nhkworld/en/news/videos/20170124151616760/

February 2, 2017

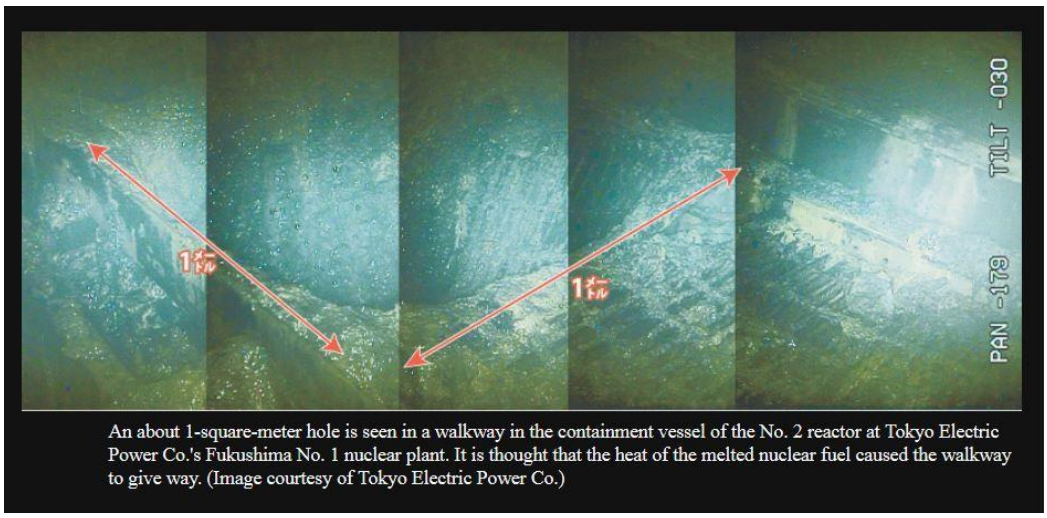
NHK video: Deadly radiation

Nuclear Watch : Deadly Radiation Estimated Inside Reactor Vessel

https://www3.nhk.or.jp/nhkworld/nhknewsline/nuclearwatch/deadlyradiationestimatedinsidereactorvessel/

The operator of the crippled Fukushima Daiichi nuclear plant says its latest estimation of the radiation level inside one of the reactors was extremely high and had the potential to be lethal to a human within a short period of time.
Tokyo Electric Power Company conducted an inspection inside the containment vessel of the plant's No.2 reactor last month using a remote-controlled camera, as part of a survey to scrap the reactor.
An analysis of the images found that the radiation was up to 530 sieverts per hour at a concrete cylinder supporting the reactor.
The level is enough to be lethal to a human within a short period of time, despite a possible error margin of up to 30 percent.
A survey conducted 1 year after the nuclear accident at a different part inside the same containment vessel logged 73 sieverts per hour.
In the latest estimation inside the vessel, the area near its opening logged 50 sieverts per hour at maximum.
The operator officials say that there are no leaks of gas with radioactive substances from the containment vessel.
Officials suspect that fuel debris; a mixture of nuclear fuel and melted parts of the reactor's facility, may be emitting strong radiation inside the vessel.
Some molten fuel penetrated the reactor's bottom and has reached the containment vessel as fuel debris.
The company plans conduct further inspections with a robot. There is a risk that some parts of the grating where the robot will be moving may be damaged by the high heat of the molten fuel.

Radiation at No.2 reactor: Extremely high



An about 1-square-meter hole is seen in a walkway in the containment vessel of the No. 2 reactor at Tokyo Electric Power Co.'s Fukushima No. 1 nuclear plant. It is thought that the heat of the melted nuclear fuel caused the walkway to give way. (Image courtesy of Tokyo Electric Power Co.)

Radiation level at Fukushima reactor highest since 2011 disaster; grating hole found

http://mainichi.jp/english/articles/20170202/p2g/00m/0dm/087000c

TOKYO (Kyodo) -- The radiation level inside the containment vessel of the No. 2 reactor at the crippled Fukushima Daiichi nuclear complex stood at 530 sieverts per hour at a maximum, the highest since the 2011 disaster, the plant operator said Thursday.

- 【Related】Radiation in Fukushima reactor containment vessel at deadly level: TEPCO
- 【Photo Special】Radiation level at Fukushima reactor highest since 2011 disaster
- 【Related】Footage points to difficulty in removing possible melted fuel at Fukushima plant

Tokyo Electric Power Company Holdings Inc. also announced that based on image analysis, a hole measuring 2 meters in diameter has been found on a metal grating beneath the pressure vessel inside the containment vessel and a portion of the grating was distorted.
According to TEPCO, the extremely high radiation level was found near the entrance area in the space just below the pressure vessel. The previously highest radiation level monitored in the interior of the reactor was 73 sieverts per hour.
The hole could have been caused by nuclear fuel that penetrated the reactor vessel as it overheated and melted due to the loss of reactor cooling functions in the days after a powerful earthquake and tsunami on March 11, 2011 hit northeastern Japan.
According to the image analysis, about 1 square meter of the grating was missing.
The plant operator plans to deploy a robot at the bottom of the reactor containment vessel, which houses the reactor pressure vessel, to check the conditions there.
The analysis follows TEPCO's discovery Monday of a black mass deposited on the grating directly beneath the pressure vessel, possibly melted fuel after the unit suffered a meltdown along with two other Fukushima Daiichi reactors.
Images captured using a camera attached to a telescopic arm on Monday also showed part of the grating has gone. A further analysis of the images found a 2-meter hole in an area beyond the missing section on the structure.
If the deposits are confirmed as fuel debris, it would be the first time the utility has found any at the three units that suffered meltdowns.
Following one of the world's worst nuclear disasters since the 1986 Chernobyl catastrophe, the No. 1 to 3 reactors suffered fuel meltdowns.

Portions of the fuel in the reactors are believed to have melted through the pressure vessels and accumulated at the bottom of the containment vessels.
The actual condition of the melted fuel has remained unknown due to high radiation

February 3, 2017

Deadly radiation level

Radiation level in Fukushima reactor could kill within a minute
http://www.asahi.com/ajw/articles/AJ201702030064.html

Images show black lumps on grating for maintenance work below the No. 2 reactor's pressure vessel at the Fukushima No. 1 nuclear power plant. TEPCO says melted fuel likely caused at least two holes in the metal grating, including an opening measuring 1 meter by 1 meter. (Provided by Tokyo Electric Power Co.)

Radiation levels that can kill a person in a minute and holes created by melted nuclear fuel could further delay decommissioning operations at the No. 2 reactor of the Fukushima No. 1 nuclear plant.
Tokyo Electric Power Co., operator of the crippled plant, said Feb. 2 that the maximum estimated radiation level near what is believed to be melted fuel in the reactor was 530 sieverts per hour, the highest so far since the triple meltdown in 2011.
In its investigation into the interior of the No. 2 reactor, TEPCO also confirmed at least two holes on grating for maintenance work below the bottom of the reactor's pressure vessel.
"The holes were likely made when the melted nuclear fuel fell from the pressure vessel and melted the grating," a TEPCO official said.
The findings were made by studying images taken from a video camera attached to a pipe that was inserted into the reactor on Jan. 30.
Radiation levels were estimated at 20 sieverts per hour, 50 sieverts per hour and 530 sieverts per hour at three spots inside the reactor's containment vessel.
The company estimated the doses from the extent of disturbances in the images caused by radiation.
Although a TEPCO official said "there is a margin of error because radiation levels were not measured directly," the company believes the scattered melted nuclear fuel inside the containment vessel was emitting high levels of radiation.
After a number of failed attempts, the remote-controlled camera took the first pictures of possible melted fuel at the plant.
However, closer inspection of the images have revealed additional problems for TEPCO, which had believed most of the melted fuel had remained inside the reactor's pressure vessel.
TEPCO plans to send an investigative robot, called Sasori (scorpion), into the containment vessel this month to more accurately measure radiation doses at various spots and take additional footage of the scattered nuclear fuel.

The utility plans to use the data to determine a fuel-removal method.
But the robot was expected to use the circular grating, measuring 5 meters in diameter, to move around. One of the holes is 1 meter by 1 meter, a potential pitfall for the robot, which is 59 centimeters long and 9 cm high.
TEPCO said it will consider a different route for the robot in its survey.
Fumiya Tanabe, an expert on nuclear safety who analyzed the 1979 Three Mile Island nuclear accident in the United States, said the findings show that both the preparation for and the actual decommissioning process at the plant will likely prove much more difficult than expected.
"We have few clues on the exact locations, the sizes and the shapes of the nuclear fuel debris," he said. "The planned investigation by the robot needs a rethink. Work to decommission the plant will require even more time."
TEPCO said it will need 30 to 40 years to complete the decommissioning process. The utility plans to start work to remove the melted nuclear fuel at the No. 2 and two other stricken reactors in 2021 after deciding on a removal method in fiscal 2018.
TEPCO has yet to determine the location and the condition of the melted fuel in the other two reactors.
(This article was written by Takashi Sugimoto, Keisuke Katori and Eisuke Sasaki.)

February 3, 2017

Radiation in Fukushima reactor containment vessel at deadly level: TEPCO

http://mainichi.jp/english/articles/20170203/p2a/00m/0na/005000c

A scorpion-like observation robot scheduled to go into the containment vessel of the No. 2 reactor at the Fukushima No. 1 nuclear plant. (Photo courtesy of Tokyo Electric Power Co.)

A scorpion-like observation robot scheduled to go into the containment vessel of the No. 2 reactor at the Fukushima No. 1 nuclear plant. (Photo courtesy of Tokyo Electric Power Co.)
Radiation inside the containment vessel of the No. 2 reactor at the Fukushima No. 1 nuclear plant measures as high as a deadly 530 sieverts per hour, the highest since the 2011 disaster, plant operator Tokyo Electric Power Co. (TEPCO) announced on Feb. 2.

- 【Related】Radiation level at Fukushima reactor highest since 2011 disaster; grating hole found
- 【Photo Special】Radiation level at Fukushima reactor highest since 2011 disaster
- 【Related】Footage points to difficulty in removing possible melted fuel at Fukushima plant

TEPCO calculated the radiation dose from video noise on footage it took inside the containment vessel in late January, when a camera was inserted to examine conditions inside and scout a route for a scorpion-like observation robot scheduled to go into the vessel later this month.
Deployment of the robot is also being reconsidered after two gaping holes were found along the robot's planned path over a 5-meter-wide circular walkway inside the containment vessel, close to where the 530-sievert radiation dose was detected.
The holes in the metal grate walkway -- one of unknown size and the other measuring about 1 meter square -- make both routes considered for the robot impassable.
"We will consider re-evaluating what observations we can take with the robot," Yuichi Okamura, an acting general manager with TEPCO's on-site nuclear power division, told reporters at a Feb. 2 news conference.
Piles of a black and dark brown substance several centimeters thick and thought to be melted nuclear fuel were also observed on the walkway, creating a further possible obstruction to the robot.
Meanwhile, examination of the 1-meter-square hole suggests the walkway was struck with tremendous force, hinting that there may be a large amount of melted fuel below.
"It is possible that the nuclear fuel rods melted onto the control rods and then dripped down," Tokyo Institute of Technology professor of nuclear engineering Yoshinao Kobayashi told the Mainichi Shimbun. "It's highly likely that part of the bottom of the pressure vessel broke and the melted fuel flowed down (onto the walkway), and then the grating warped and gave way due to the fuel's heat."

See also: http://www.japantimes.co.jp/news/2017/02/03/national/tepco-finds-gaping-hole-grate-containment-vessel-potential-fuel-debris-fukushima-no-1-power-plant/#.WJSIY_KDmos

February 6, 2017

New robot for decommissioning

A new investigative robot, equipped with a censoring unit hanging through metal grating, is scheduled to be send into the No. 1 reactor at the Fukushima No. 1 nuclear power plant in the coming months. (Kohei Tomida)

New robot built to study inside of No. 1 reactor at Fukushima plant

http://www.asahi.com/ajw/articles/AJ201702060040.html

By KOHEI TOMIDA/ Staff Writer

HITACHI, Ibaraki Prefecture--Another robot has been developed for the elusive goal of locating melted fuel and surveying the interior of the No. 1 reactor at the Fukushima No. 1 nuclear plant.

A team of engineers and researchers from Hitachi-GE Nuclear Energy Ltd. and the International Research Institute for Nuclear Decommissioning revealed the robot on Feb. 3.

Tokyo Electric Power Co., operator of the plant, plans to deploy the robot into the No. 1 reactor before the end of March.

The robot will be fitted with a censoring unit mounted with a camera, dosimeter and lighting. Its purpose is to give TEPCO an idea of the location and condition of the melted nuclear fuel in the reactor.

Most of the melted fuel is believed to have fallen through the reactor's pressure vessel, landed on the bottom of the surrounding containment vessel, and is soaking in cooling water about 2 meters deep.

The new robot will maneuver around metal grating originally set up for maintenance work about 3.5 meters above the bottom of the containment vessel.

At each of five survey points, the robot will lower the censoring unit through the grating. The unit can operate in water.

In April 2015, TEPCO sent two robots into the No. 1 reactor, but they could not locate the melted fuel. One of them became stuck, and high radiation levels disabled the camera on the other. TEPCO abandoned the machines in the reactor.

On Jan. 30, a remote controlled video camera sent into the No. 2 reactor took what are believed to be the first images of melted fuel at the plant.

New robot to inspect Fukushima reactor unveiled

https://www3.nhk.or.jp/nhkworld/en/news/20170203_21/

A test run of a robot designed to inspect a reactor at a damaged nuclear power plant in Fukushima Prefecture was shown to the public at a plant in Ibaraki Prefecture, north of Tokyo on Friday.

The operator of the Fukushima Daiichi nuclear plant plans to send the robot into one of the facility's damaged reactors to find out the condition of melted fuel there.

The robot is 70 centimeters long and less than 10 centimeters wide. It's designed to drop a camera and dosimeter using a fishing line-like cable to look deep inside a containment vessel.

Tokyo Electric Power Company, or TEPCO, plans to use the robot next month to inspect the plant's No.1 reactor as part of efforts to decommission the plant.

Fuel at the reactor is believed to have melted through the core during the 2011 accident and accumulated at the bottom of the containment vessel.

The robot is to be remotely controlled while inside the vessel, which humans cannot enter.

The camera may not be able to show conditions in 2-meter-deep contaminated water. Engineers plan to estimate the location of the fuel based on radiation measurements.

An engineer at Hitachi-GE Nuclear Energy who's involved in the robot's development says locating melted fuel would provide a significant clue about how to remove it.

TEPCO sent a remote-controlled camera into the plant's No.2 reactor last month.

February 6, 2017

Decommissioning difficulties ahead

Editorial: Video shows difficulty in decommissioning Fukushima nuke plant

http://mainichi.jp/english/articles/20170206/p2a/00m/0na/023000c

Video footage of the inside of the No. 2 reactor at the Fukushima No. 1 Nuclear Power Plant has proved that it is more difficult than initially believed to decommission the tsunami-ravaged plant.

- 【Related】Radiation level at Fukushima reactor highest since 2011 disaster; grating hole found
- 【Related】Radiation in Fukushima reactor containment vessel at deadly level: TEPCO
- 【Related】Footage points to difficulty in removing possible melted fuel at Fukushima plant

The camera that was inserted into an area below the reactor's pressure vessel shows a deposited substance near a foothold in the area. The substance is highly likely to be melted nuclear fuel.
Nearly six years have passed since the March 2011 Great East Japan Earthquake and tsunami that triggered the nuclear crisis. The fact that the condition of the inside of the reactor has been confirmed represents a step forward. However, analysis conducted by Tokyo Electric Power Co. (TEPCO), the operator of the crippled power station, shows that the levels of radiation in the reactor building are so high that someone would die within less than a minute if they were exposed to radiation inside the

facility. The footage shows that the deposited substances are scattered around in a wide area of the structure. TEPCO had planned to introduce a robot equipped with a camera into the reactor building possibly by the end of this month to fully probe the condition inside, but the footage has forced the utility to reconsider the plan.
If the situation is left as it is, the time required to decommission and dismantle the power station, which is believed to take 30 to 40 years, could be prolonged and the estimated costs of decommissioning the plant, which has already been revised upward from the initial 2 trillion yen to 8 trillion yen, could further rise. TEPCO is required to foot the costs of decommissioning the Fukushima plant, but the expenses will be passed on to consumers who pay electric power charges.
The government and TEPCO should fundamentally review their responses to the nuclear disaster, such as the development of technologies necessary to decommission the plant and ways to reduce decommissioning costs.
Meltdowns occurred in the cores of the No. 1 to 3 reactors at the Fukushima No. 1 Nuclear Power Plant in the accident. According to the road map toward decommissioning the plant, drawn up by the government and TEPCO, the utility is supposed to determine a method to remove melted fuel at one of the reactors by the end of fiscal 2018 and begin work within 2021.
To do so, it is necessary to ascertain where and how deposits of melted fuel are scattered, but this remains unclear.
TEPCO hit a snag at the beginning of the recent survey on the No. 2 reactor. Still, the condition of the reactor is far better than those of the No. 1 and 3 reactors -- which were badly damaged in hydrogen explosions, obstructing surveys of their interiors.
Reactor core meltdowns occurred in an accident at a nuclear plant on Three Mile Island in the United States in 1979. Work to remove melted fuel commenced six years after the outbreak of the disaster and was completed 11 years after the accident. Workers remotely controlled a device to remove melted fuel from the pressure vessel while filling the vessel with water to block radiation.
Work at the Fukushima plant is far more difficult than at the Three Mile power station because nuclear fuel has melted and leaked out of the pressure vessels of the No. 1 to 3 reactors. How and where the melted fuel will be stored has not been decided yet. The government and TEPCO should obtain knowledge both from Japan and overseas to develop technologies to store melted fuel.
In considering the road map toward decommissioning the plant, it should be kept in mind that the degree of progress in the work will affect the restoration of areas hit by the nuclear disaster and the prospects for evacuated residents to return to their homes. However, if an unreasonably tight schedule is created, it could increase the risks of worker accidents and exposure to radiation.
Although it is a difficult task, the government and TEPCO are required to ensure transparency and steadily overcome obstacles to decommission the crippled power station.

February 8, 2017

Funding decommissioning

New gov't bill would make TEPCO reserve funds for Fukushima plant decommissioning

http://mainichi.jp/english/articles/20170208/p2a/00m/0na/007000c

The government on Feb. 7 submitted a legal revision bill to the Diet to stabilize funding for the decommissioning of the Fukushima No. 1 nuclear plant.

- 【Related】Editorial: Video shows difficulty in decommissioning Fukushima nuke plant

- 【Related】Radiation level at Fukushima reactor highest since 2011 disaster; grating hole found
- 【Related】Radiation in Fukushima reactor containment vessel at deadly level: TEPCO

The subject of the revisions is the law establishing the Nuclear Damage Compensation and Decommissioning Facilitation Corp. (NDF), which manages the flow of funds to nuclear accident victims and the long process of dismantling the disaster-stricken Fukushima No. 1 plant.
The revisions will require plant operator Tokyo Electric Power Co. (TEPCO) to set aside funds secured through corporate restructuring with the NDF. The revisions will also give the Ministry of Economy, Trade and Industry the right to perform spot inspections of TEPCO offices to make sure the utility is making appropriate deposits.
Furthermore, the revision bill states that TEPCO must submit a reactor decommissioning plan and a financing scheme to fund that plan to the industry ministry every fiscal year. The NDF and the industry ministry will examine the utility's decommissioning project structure, and judge if it is being properly implemented.
The government is looking to have the revisions enter force within the year, with TEPCO capital transfers to the NDF to commence as early as next fiscal year, which starts on April 1, 2017.
Last year, the industry ministry increased the total estimated cost for Fukushima No. 1 plant decommissioning from 2 trillion yen to 8 trillion yen, in preparation for the difficult work of removing the melted fuel from three of the power station's reactors.
TEPCO's annual revenues currently stand at about 400 billion yen, while reactor decommissioning alone is expected to cost some 300 billion yen per year. Nevertheless, the industry ministry believes the utility should be able to cover its obligations if it can improve its earning power through management restructuring and the restart of the Kashiwazaki-Kariwa Nuclear Power Plant in Niigata Prefecture.
However, the governor of Niigata Prefecture has been reluctant to green-light the restart of the Kashiwazaki-Kariwa reactors, and there is no projected schedule to bring the plant back on line. In addition, it is possible that the cost of decommissioning the Fukushima No. 1 plant reactors will continue to swell.

February 9, 2017

New spikes?

Lost in translation: Fukushima readings are not new spikes, just the same “hot mess” that’s always been there

http://www.beyondnuclear.org/japan/2017/2/9/lost-in-translation-fukushima-readings-are-not-new-spikes-ju.html

The ongoing Fukushima nuclear catastrophe has been back in the news lately following record high readings at the reactor site. Radiation levels were a maximum of 530 sieverts per hour, the highest recorded since the triple core meltdown in March 2011.
But upon further examination, the story has been misreported, in part due to mistranslation. In fact, according to Nancy Foust of SimplyInfo.org, interviewed on Nuclear Hotseat, there was no spike. High readings were in expected locations that TEPCO was only able to access recently. Therefore, the reading became evident because workers were getting closer to the melted fuel in more dangerous parts of the facility. In other words, it’s not a new hot mess, just the same hot mess it’s always been, pretty much from the beginning. The good news is nothing has changed. The bad news is – nothing has changed.

The confusion was initially caused by a translation error that SimplyInfo.org thinks occurred between the *Kyoto News* and *Japan Times*. Since this happened, Foust and her group have been trying to get news sources to correct the stories, with limited success.
The elevated radiation levels are inside containment (good news) in ruined unit 2 and were discovered using a camera, not proper radiation monitors. Therefore, the high reading may not be reliable since it is an estimate based on interference data with the camera. TEPCO is planning on sending in a robot properly equipped with radiation detectors to take a reliable reading. Although no date has been given, TEPCO indicates it expects to deploy the robot within 30 days or so.
Foust theorizes that the bulk of spent fuel is probably right below the reactor vessel burned into the concrete below. No one knows if fuel has gone into the ground water below that.

See also: **Fukuleaks** http://www.fukuleaks.org/web/?p=16094

February 10, 2017

Cameras affected by radiation

Strong radiation hampers robotic survey

https://www3.nhk.or.jp/nhkworld/en/news/20170210_02/

The operator of the crippled Fukushima Daiichi nuclear plant has suspended a preliminary survey inside a containment vessel due to failure of the robot's camera.

Tokyo Electric Power Company suspects that high radiation inside the vessel likely affected the camera.

Engineers sent a remote-controlled robot into the vessel of the No.2 reactor on Thursday. It moved forward on a metal rail, clearing debris with water from a pressure hose.

As it advanced toward the center for about a meter, images sent from one of its 3 cameras began turning dark. The engineers suspended the survey and retrieved the robot.

Analysis of the images suggests that extremely high radiation of up to 650 sieverts an hour inside the containment vessel caused the failure.

Images in another survey last month by a remote-controlled camera pointed to an estimated level of up to 530 sieverts an hour.

The utility plans a full survey using a scorpion-shaped robot to directly measure radiation levels and temperatures.

But it is being forced to review the method of the survey as the strong radiation inside the vessel might make it difficult to conduct a survey, which is crucial as a preparatory step.

High radiation, deposits and debris

High radiation readings at Fukushima's No. 2 reactor complicate robot-based probe

http://www.japantimes.co.jp/news/2017/02/10/national/high-radiation-readings-at-fukushima-no-2-reactor/#.WJ69qvKDmos

KYODO
The high radiation estimates in the No. 2 reactor of the stricken Fukushima No. 1 nuclear plant will probably force a rethink of the nationalized utility's robot-based strategy for locating its molten fuel.
According to an analysis of Thursday's abbreviated probe, the radiation in the primary containment vessel is about 650 sieverts per hour, more than the 530 sieverts estimated late last month, Tokyo Electric Power Company Holding Inc. said.
That level could kill a person quickly and indicates the fuel likely burned through the pressure vessel during the meltdown and is somewhere nearby.
Tepco, as the utility is known, halted Thursday's robot after its camera went dark. The company suspects the problem was caused by the radiation.
A number of government officials had questioned the 530-sievert reading because it was calculated from camera interference, rather than measured by a dosimeter. Given the unorthodox method, some were reluctant to release the figure.
But Thursday's analysis, also calculated via video footage, reinforced the experts' findings, making it likely the radiation in that particular spot, near the pressure vessel, is high despite the considerable 30 percent margin of error.
"I had hoped that the previous results were wrong, but it is certain that there is an area with high radiation levels inside the reactor," a government source said.
A Tepco official said a reading of 500 to 600 sieverts should be "basically correct," especially given that the camera, which was designed for 1,000 sieverts of cumulative exposure, broke down within two hours.
On Thursday, the robot was equipped with a high-pressure water pump to wash off deposits up to 2 cm thick suspected to be the melted remains of paint and cable insulation from a 7-meter rail leading to an area beneath the pressure vessel, which holds the core.
Tepco hopes to send another robot along the rail to survey the bottom of the pressure vessel later this month.
A previous attempt on Tuesday to clear the rail was suspended because of a water pump malfunction. The deposits cover 5 meters of the rail. The robot was able to clean about a meter of it close to the exterior of the primary containment vessel but it could not do any more because the deposits were too tough to remove, Tepco said.
If the deposits aren't cleared, they might prevent the robot from getting beneath the pressure vessel, it said.
Three of the Fukushima No. 1 plant's six reactors were hit by meltdowns after the March 2011 mega-quake and tsunami caused a station blackout that knocked out the plant's cooling systems. It is the worst nuclear disaster since the Chernobyl in 1986.
Tepco is still in the early stage of assessing the conditions in and around the damaged reactors so the fuel can be removed. The decommissioning is expected to take decades.

Radiation level in Fukushima No. 2 reactor measured higher

http://www.asahi.com/ajw/articles/AJ201702100035.html

A pressure washer-equipped robot clears the path inside the containment vessel of Fukushima No. 1 nuclear power plant's No. 2 reactor on Feb. 9. The black lumps are believed to be melted fuel. (Provided by Tokyo Electric Power Co.)

A camera attached to the robot deployed inside Fukushima No. 1 nuclear power plant's No. 2 reactor shows how it clears its path covered with debris and deposits using a pressure washer. (Captured from video provided by Tokyo Electric Power Co.)

The road to decommissioning Fukushima No. 1 nuclear power plant's No. 2 reactor could be rockier than expected, as radiation levels on Feb. 9 were even deadlier than those recorded in late January. Tokyo Electric Power Co. announced that day that radiation levels inside the reactor were estimated at up to 650 sieverts per hour, much higher than the record 530 sieverts per hour marked by the previous survey.

A camera made its way inside the reactor's containment vessel for the first time on Jan. 30 and spotted fuel rods that had melted into black lumps in the nuclear accident in the aftermath of the 2011 Great East Japan Earthquake and tsunami disaster.

The plant operator made the latest estimate from the amount of camera noise experienced by the robot that ventured into the lion's den that morning.

Equipped with a pressure washer, the machine was deployed to pave the way for the Sasori (scorpion) robot that is set to survey the reactor's interior in greater detail.

The robot's task was to hose down melted fuel and other substances as it traveled along a rail measuring 7 meters long and 0.6 meter wide connecting the outer wall of the containment vessel with the reactor's core. It started operating from a point located 2 meters from the exit of the tunnel bored into the side of the vessel.

But about two hours into its journey, in which it had progressed about a meter, the camera footage started getting dark, TEPCO said. The amount of radiation emitted by the melted fuel may have taken a toll on the camera's well-being.

As the robot could be left stranded inside the vessel if the camera broke down completely, the utility called off the operation seven hours earlier than scheduled and retrieved the device.

TEPCO analyzed the footage and concluded that the doses amounted to about 650 sieverts per hour, which is deadly enough to kill a human in less than a minute.

As the robot's camera was designed to withstand a cumulative dosage of 1,000 sieverts per hour, the utility commented that "it's consistent with how the camera started to break down after two hours." The plant operator plans to deploy the Sasori surveyor robot before the end of February.
"We will be assessing the amount of deposits and debris to decide how far Sasori can advance," a TEPCO official said.

Fukushima Daiichi NPS Prompt Report (Feb 10,2017)

PROGRESS AT UNITS 1 AND 3, AND 'ICE WALL' UPDATE HIGHLIGHT LATEST NUCLEAR SAFETY PROGRESS REPORT

http://www.tepco.co.jp/en/press/corp-com/release/2017/1375451_10469.html

Work in Units 1 and 3 are preparations for removal of fuel assemblies from the spent fuel pools

TOKYO, Feb. 10-Preparations at Fukushima Daiichi Units 1 and 3 for the eventual removal of fuel assemblies, together with progress in freezing the "ice wall," are the highlights of the latest quarterly report on progress in TEPCO Holdings' implementation of its Nuclear Safety Reform Plan.
Also reported is continuing work to ensure that the Kashiwazaki-Kariwa Nuclear Power Station is getting ready for safe operation based on the Nuclear Regulation Authority's requirements, and a summary of the company's self-assessment effort. The report covers the third quarter of TEPCO Holdings' current fiscal year, October-December 2016.

Preparations for Spent Fuel Removal

In Unit 1, temporary wall panels that had been put in place after the March 2011 accident were being carefully removed so that rubble scattered on the reactor's top floor can be removed to conduct the future fuel extractions. The panel removals were completed in November, and the goal is to begin fuel removal operations during FY2020.
In Unit 3, additional shielding has been put in place on the top floor to protect employees and contractors who will need to work there during preparation for the fuel removal from the spent fuel pool. Other work to support fuel removal equipment was performed in the unit, and the plan is to begin removing fuel in FY 2018.

"Ice Wall" (the landside impermeable wall)

The report also summarizes developments during the quarter in the freezing of the "ice wall" - actually a frozen soil barrier designed to isolate the four damaged reactor buildings from groundwater flows. It reports that the frozen state of the soil is being maintained, and that the amount of water pumped up daily has declined from 400 cubic meters to 140 cubic meters.

Self-Assessment

The report briefly summarized TEPCO Holdings' major self-assessment activity. The self-assessment's findings, it said, "revealed the need to enhance organizational governance and human resource cultivation. In response to these findings, we are sharing information on basic plans and priorities and quickly implementing necessary reforms, and a management model is being established and developed as a governance enhancement measure to promote follow-ups by management." (A more

detailed report including action plans and actions being implemented was provided to the Nuclear Reform Monitoring Committee in January, after the close of the quarter, and is available on TEPCO Holdings' website at http://www.tepco.co.jp/en/press/corp-com/release/2017/1368951_10469.html.)
The report also discusses progress at Kashiwazaki-Kariwa, and in the overall implementation of the Nuclear Safety Reform Plan, including better communication and various management reforms. An English-language summary of the quarterly progress report may be seen at http://www.tepco.co.jp/en/press/corp-com/release/betu17_e/images/170210e0101.pdf.
The full report is available (currently only in Japanese) at http://www.tepco.co.jp/press/release/2017/pdf1/170210j0102.pdf.

About TEPCO Group
Tokyo Electric Power Company Holdings, Inc. (TEPCO Holdings) is Japan's largest power company group, holding three independent business entities: TEPCO Fuel & Power, Inc., TEPCO Power Grid, Inc., and TEPCO Energy Partner, Inc. As a group, it generates, distributes, and sells electricity and other types of energy principally to the Kanto metropolitan area, which includes Japan's two most populous cities, Tokyo and Yokohama. Its 33,000 employees are committed to providing safe, reliable power to its 29 million customers as well as fulfilling its responsibilities to the communities of Fukushima. (As of April 1, 2016)
TEPCO Website:
http://www.tepco.co.jp/en/index-e.htmlTEPCO Facebook page:
https://www.facebook.com/OfficialTEPCOenTEPCO Twitter page:
https://twitter.com/TEPCO_English

February 13, 2017

Radiation levels might be higher

Robot Measures Highest Radiation Levels Yet In Fukushima PCV

http://www.nucnet.org/all-the-news/2017/02/13/robot-measures-highest-radiation-levels-yet-in-fukushima-pcv

A robot sent into the Unit 2 primary containment vessel (PCV) at the Fukushima-Daiichi nuclear power station has measured radioactivity as high as 650 sieverts per hour (Sv/hr), Tokyo Electric Power Company (Tepco) has said. Tepco said the robot had been sent into the PCV on 9 February 2017 to clear a path for a "scorpion" robot to further explore the inside of the PCV. Tepco said "various safety precautions" were taken to ensure that radiation remained inside the PCV and to protect the robot. The robot and its cameras are designed to withstand 100 Sv/hr for 10 hours and the time it spends inside the PCV is being adjusted as necessary. Tepco said on 8 February 2017 that the radiation level in the Unit 2 PCV may have reached as high as 530 Sv/hr, but that reading was only an estimate based on analysis of images from the robot with a margin of error of 30%. Tepco said those images were "intriguing", but further examination was necessary before it could be verified that they showed fuel debris from the March 2011 accident. That estimate of 530 Sv/hr far exceeded the previous high of 73 Sv/hr recorded at the reactor following the accident. At this level of radioactivity, a person could die from the briefest of exposures. At the time Tepco said it would not be surprised if even higher

radiation levels were found there, but only actual measurements would tell. Tepco said there had been no change to radiation readings outside the PCV.

February 16, 2017

Even robots can't take it

Robot stops working in Fukushima reactor

https://www3.nhk.or.jp/nhkworld/en/news/20170216_34

The operator of the crippled Fukushima Daiichi nuclear power plant says it suspended a survey by a robot at one of its reactors after the device stopped working.

Tokyo Electric Power Company, or TEPCO, sent the scorpion-shaped robot into the containment vessel of the plant's No. 2 reactor on Thursday.

The company believes fuel in the reactor melted through its core during the 2011 accident and accumulated at the bottom of the facility's containment vessel.

The survey was aimed at getting a close look at what could be fuel debris -- a mixture of nuclear fuel and melted parts of the reactor.

The robot was also expected to measure radiation and temperatures there to gather data for scrapping the reactor.

TEPCO officials say the device was advancing on a metal rail leading to a central area below the reactor's core, but stopped moving before it could reach the center.

The officials say they decided to give up the robot and cut its remote-control cable.

TEPCO plans to analyze data collected by the robot and figure out how to carry out future probes.

Robotic reactor survey suspended midway

https://www3.nhk.or.jp/nhkworld/en/news/20170216_29/

The operator of the crippled Fukushima Daiichi nuclear power plant says it suspended a survey by a robot there after the device stopped working.

Tokyo Electric Power Company, or TEPCO, sent the scorpion-shaped robot into the containment vessel of the plant's No. 2 reactor on Thursday.

The survey was aimed at measuring radiation and temperatures there to gather data for scrapping the reactor.

TEPCO officials say the robot was advancing on a metal rail leading to a central area below the

reactor's core while recording images and measuring radiation, but stopped moving before it could reach the center.

February 17, 2017

No.2 robot abandoned

The Sasori robot is stuck inside the containment vessel of Fukushima No. 1 nuclear power plant's No. 2 reactor on Feb. 16. (Provided by International Research Institute for Nuclear Decommissioning)

The insides of the containment vessel of the No. 2 reactor at the Fukushima No. 1 nuclear power plant as captured by the Sasori robot on Feb. 16 (Provided by International Research Institute for Nuclear Decommissioning)

Robot stuck in Fukushima No. 2 reactor on 1st try, abandoned

http://www.asahi.com/ajw/articles/AJ201702170048.html

The Sasori robot surveys the interior of the containment vessel of the No. 2 reactor at the Fukushima No. 1 nuclear power plant before getting stuck and being abandoned on Feb. 16. (Provided by International Research Institute for Nuclear Decommissioning)

In the latest hitch in efforts to decommission reactors at the Fukushima No. 1 nuclear power plant, a robotic surveyor became mired in deposits and was lost on its maiden journey on Feb. 16.
Tokyo Electric Power Co., which operates the plant in Fukushima Prefecture, had to abandon the Sasori (scorpion) robot after it became stuck inside the containment vessel of the power station's No. 2 reactor that morning.
The highly touted probe was specially developed for the important task of surveying the interior of the crippled reactor and collecting data to assist in removing the melted fuel.
But with the environment inside too treacherous for a key component in the process, TEPCO's decommissioning project seems to have come to a standstill.
According to the utility, the robot entered the containment vessel around 8 a.m. It traveled along a 7.2-meter-long rail connecting the outer wall of the containment vessel with its central portion immediately beneath the pressure vessel.
But about 5 meters into its mission, the robot's controls started to become less responsive. TEPCO believes it was due to deposits and other debris that are blocking the rail entering its drive system.
The operator tugged on the electrical cable connected to the robot and had it pull back to an area along its path with less obstacles, but it ultimately became stuck there.
The robot measured the radiation levels in the area at 210 sieverts per hour, which is lethal enough to kill a human in two minutes. Earlier, the company had estimated the level in the area at 650 sieverts per hour from video footage captured on Feb. 9 by another robot that paved the way for the Sasori.
With the robot completely immobilized, TEPCO gave up on retrieving it around 3 p.m. The operator cut the electric cable and closed the tunnel bored into the wall of the containment vessel, entombing the robot inside.
The probe was cast aside to the edge of the 0.6-meter-wide rail so that it would not impede future surveyor robots.
Had everything gone according to plan, TEPCO would have sent the Sasori onto the grating in the heart of the containment vessel, which is covered in black chunks believed to be melted fuel rods that fell from the pressure vessel above.
The utility had hoped to measure the dosage of these radioactive lumps, as well as capture images of the underside of the pressure vessel, which contains holes from when the nuclear fuel burned through it in the meltdown that was triggered by the Great East Japan Earthquake and tsunami in 2011.
(This article was written by Kohei Tomida and Chikako Kawahara.)

Leaving "a trail of dead robots"

Fukushima fuel-removal quest leaves trail of dead robots

http://www.japantimes.co.jp/news/2017/02/17/national/fukushima-fuel-removal-quest-leaves-trail-dead-robots/#.WKc9NvKDmos

by Emi Urabe

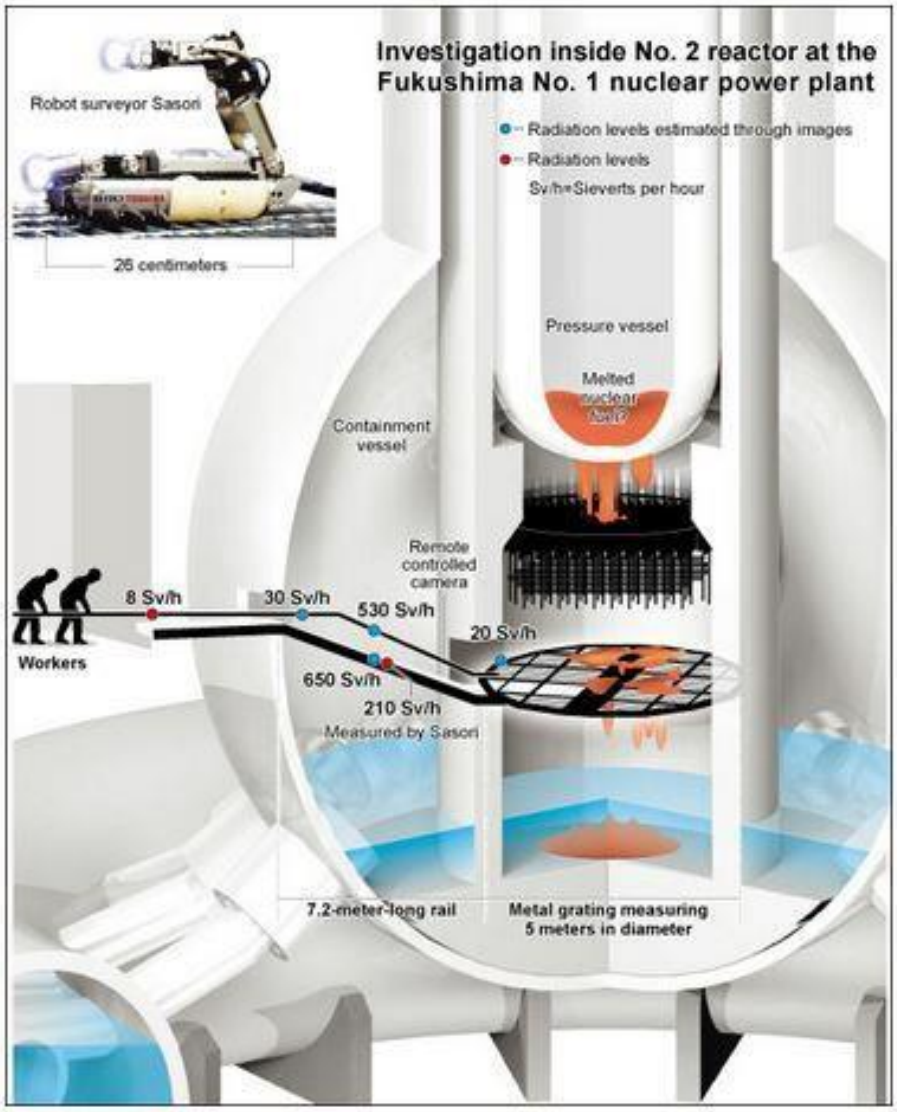
Bloomberg

The latest robot attempting to find the 600 tons of nuclear fuel and debris that melted down six years ago in the wrecked Fukushima No. 1 nuclear power plant met its end in less than a day.
The scorpion-shape machine, built by Toshiba Corp., entered the No. 2 reactor core Thursday and stopped 3 meters (10 feet) short of a grate that would have provided a view of where fuel residue is suspected to have gathered. Two previous robots aborted similar missions after one got stuck in a gap and another was abandoned after finding no fuel during six days of searching.
After spending most of the time since the 2011 disaster containing radiation and limiting ground water contamination, scientists still don't have all the information they need for a cleanup that the government estimates will take four decades and cost ¥8 trillion. It is not yet known if the fuel melted into or through the containment vessel's concrete floor, and determining the fuel's radioactivity and location is crucial to inventing the technology needed to remove it.
"The road map for removing the fuel is going to be long, 2020 and beyond," Jacopo Buongiorno, a professor of nuclear science and engineering at the Massachusetts Institute of Technology, said in an e-mail. "The re-solidified fuel is likely stuck to the vessel wall and vessel internal structures. So the debris have to be cut, scooped, put into a sealed and shielded container and then extracted from the containment vessel. All done by robots."
To enter a primary containment vessel, which measures about 20 meters at its widest, more than 30 meters tall and is encased in meters of concrete, outside air pressure is increased to keep radiation from escaping and a sealed hole is opened that the robot passes through. Three reactors at the plant suffered meltdowns, and each poses different challenges and requires a customized approach for locating and removing the fuel, said Tatsuhiro Yamagishi, Tokyo Electric Power Co. Holdings Inc. spokesman.
The machines are built with specially hardened parts and minimal electronic circuitry so they can withstand radiation, if only for a few hours at a time. Thursday's mission ended after the robot's left roller-belt failed, according to Tepco. Even if it had returned, this robot, like all others so far designed to aid the search for the lost fuel, was expected to find its final resting place inside a reactor.
Hitachi Corp. in the next two months plans to send a machine into the No. 1 reactor core that scientists hope can transmit photos of the fuel and measure radiation levels.
The snake-like robot will lower a camera on a wire from a grate platform in the reactor to take photos and generate 3-D models of the bottom of the containment vessel. This will be the third time for Hitachi to send in a robot of this design.
While the company is hopeful this robot will find some of the fuel, it will likely be unable to find all of it, according to Satoshi Okada, a Hitachi engineer working on the project. The company is already planning the next robot voyage for sometime after April.
"We are gathering information so that we can decide on a way to remove the fuel," said Okada. "Once we understand the situation inside, we will be able to see the way to remove the fuel.
On Thursday, Toshiba's scorpion-like robot entered the reactor and stopped short of making it onto the containment vessel's grate. While Tepco decided not to retrieve it, the company views the attempt as progress.
"We got a very good hint as to where the fuel could be from this entire expedition," Tepco official Yuichi Okamura said Thursday at a briefing in Tokyo. "I consider this a success, a big success."
Tepco released images last month of a grate under the No. 2 reactor covered in black residue that is possibly the melted fuel — one of the strongest clues yet to its location. The company measured levels of around 650 sieverts per hour through the sound-noise in the video, the highest so far recorded in the Fukushima complex.
A short-term, whole-body dose of over 10 sieverts would cause immediate illness and subsequent death within a few weeks, according to the World Nuclear Association.
"Radiation levels near the fuel are lethal," said MIT's Buongiorno, who holds the university's Tepco chair, a professorship based on an initial donation by the company 10 years ago. There are no formal affiliations or obligations for the faculty who receive the chair, he said.

Because the No. 2 unit is the only one of the three reactors that didn't experience a hydrogen explosion, there was no release into the atmosphere and radiation levels inside the core are higher compared with the other two units, according to the utility.
Tepco has focused on removing spent fuel in the upper part of the reactor structure, which Toshiba aims to extract with a claw-like system. This fuel didn't melt and is still in a pool that controls its temperature.
The spent fuel in No. 3 is scheduled for removal before the end of the decade. It was first of the three reactors to melt down. Toshiba is developing another robot to search for melted fuel and it is planned to enter sometime in the year ending March 2018.
The company has not yet announced the design or strategy.

February 19, 2017

Where IS the fuel?



Radiation levels at Fukushima reactor puzzle nuclear experts

http://www.asahi.com/ajw/articles/AJ201702190042.html

A robot was expected to solidify ways to clean up the No. 2 reactor at the Fukushima No. 1 nuclear plant, but its short-lived mission raised puzzling questions that could derail existing decommissioning plans.
The robot, Sasori, was abandoned in the melted-down reactor after it became stuck in deposits and other debris that are believed to have interfered with its drive system.
But it did take radiation measurements that indicate Tokyo Electric Power Co., operator of the plant, was too optimistic about the state and location of the melted fuel within the reactor. The melted fuel, in fact, may be spread out all over the reactor's containment vessel.
Scientists had believed the melted nuclear fuel fell through the reactor's pressure vessel and landed on metal grating and the floor of the containment vessel.
The results of Sasori's investigation, coupled with previous data taken from possible images of the melted fuel, show the situation within the reactor is much worse than expected. And a fresh investigation into the reactor is now nowhere in sight.
A remote-controlled video camera inserted into the reactor on Jan. 30 took what are believed to be the first images of melted fuel at the plant, which suffered a triple meltdown after the March 2011 Great East Japan Earthquake and tsunami.
Based on the images, TEPCO estimated 530 sieverts per hour at a point almost halfway between the metal grating directly beneath the pressure vessel and the wall of the containment vessel. Black lumps on the grating are believed to be melted fuel.
A different robot sent in on Feb. 9 to take pictures and prepare for Sasori's mission estimated 650 sieverts per hour near the same spot.
Both 530 and 650 sieverts per hour can kill a person within a minute.
Sasori, equipped with a dosimeter and two cameras, on Feb. 16 recorded a reading of 210 sieverts per hour near the same location, the highest figure measured with instruments in the aftermath of the disaster.
Sasori was supposed to travel along a rail connecting the outer wall of the containment vessel with the metal grating to measure radiation doses and shoot pictures inside, essential parts of work toward decommissioning the reactor.
After traveling only 2 meters, the robot became stuck before it could reach the metal grating.
TEPCO at a news conference repeatedly said that Sasori's investigation was not a "failure" but had produced "meaningful" results.
However, an official close to TEPCO said, "I had great expectations for Sasori, so I was shocked by how it turned out."
Hiroaki Abe, professor of nuclear materials at the University of Tokyo who has studied TEPCO's footage, tried to explain why high doses were estimated between the pressure vessel and the containment vessel.
"Instead of directly landing on the rail, the melted nuclear fuel may have flown off after it reacted violently with the concrete, which had a high moisture content, at the bottom of the containment vessel, just like what happens when lava pours into the sea," Abe said.
But he said this scenario raises a puzzling question, considering the estimated radiation readings near the area below the pressure vessel were down to 20 sieverts per hour, according to an analysis of the video footage.
"If nuclear fuel debris had splattered around, the radiation levels at the central area below the pressure vessel must be extremely high," he said. "In addition, deposits on the rail would have taken the shape of small pieces if they were, in fact, flying nuclear fuel debris. The findings are puzzling."
Images by the remote-controlled camera also showed that equipment in the lower part of the pressure vessel was relatively well preserved, indicating that the hole at the bottom of the vessel is not very large.
"How to remove nuclear fuel debris will all depend on how much remains inside the pressure vessel and how much fell out," Abe said.

Toru Obara, professor of nuclear engineering at the Tokyo Institute of Technology, stressed the need to retrieve substances from the bottom of the robots or elsewhere.
"We could get clues as to the state of the melted nuclear fuel and the development of a meltdown if we could figure out which materials mixed with the nuclear fuel," he said.
The surveys by the camera and robots were conducted from a makeshift center at the No. 2 reactor. The center's walls are made from radiation-blocking metal.
TEPCO and the government plan to determine a method to remove nuclear fuel debris in fiscal 2018 before they proceed with the actual retrieval process at one of the three destroyed reactors.
One possible method involves filling the containment vessels with water to prevent radioactive substances from escaping.
(This article was compiled from reports by Kohei Tomida, Masanobu Higashiyama and Takashi Sugimoto)

February 23, 2017

"Just peeking"

Fukushima robots not enough to devise fuel-removal plan for reactor 2: Tepco

http://www.japantimes.co.jp/news/2017/02/23/national/pics-fukushima-robots-not-enough-devise-fuel-removal-plan-reactor-2-tepco/#.WK_msPKDmos

by Kazuaki Nagata

Staff Writer

OKUMA, FUKUSHIMA PREF. – While a recent investigation found what may be melted nuclear fuel rods in reactor No. 2 containment vessel at the Fukushima No. 1 plant, that information isn't nearly enough to devise an effective method for removing it, the chief of the plant told reporters during a media tour Thursday.
"We put in cameras and robots and obtained valuable images, though they were partial . . . but it's still unclear what is really going on there," said Shunji Uchida, who became chief of the crippled plant last July. "We first need to know the situation of the debris."
Last month, the utility inserted a 10.5-meter rod with a camera on its tip into a hole in the No. 2 reactor's primary containment vessel and discovered black lumps sticking to the grating directly underneath the suspended pressure vessel, which holds the core.
Tepco claims it is still unsure whether the lumps are really melted fuel that burned through the bottom of the pressure vessel. Although it is still years away from actually trying to remove the fuel, Tepco, the government and related parties are planning to decide on a basic strategy this summer and go into more detail next year.
Uchida described last month's surveillance operation as "just peeking."
Engineers are playing with the idea of refilling the primary containment vessel with water during debris cleanup operations to reduce the intensity of the radiation, but since the PCV was probably damaged during the meltdown crisis in March 2011, the water that's being pumped in 24/7 to keep the fuel cool is just leaking back out.
According to past analyses, some of the melted fuel rods penetrated the pressure vessel and fell into the containment vessel surrounding it after the March 11 quake and tsunami caused a station blackout at the plant, crippling all cooling functions.

February 24, 2017

New robot for No.1 survey

Another robot survey to be tried at reactor

https://www3.nhk.or.jp/nhkworld/en/news/20170224_09/

The operator of the crippled Fukushima Daiichi nuclear plant says it will conduct another robot survey at a different reactor after one at its No.2 reactor failed earlier this month.

For the survey in March, Tokyo Electric Power Company will use a robot that is 70 centimeters long and less than 10 centimeters wide. It will move through a narrow pipe into the containment vessel of reactor No.1.

It will travel on grating inside the vessel. At 5 locations where there are openings, it is to drop a camera and dosimeter using a thin cable to probe deep inside the vessel.

Like some other reactors at the plant, fuel inside the No.1 reactor is believed to have melted down through the reactor core. The fuel is likely to have mixed with other materials used in the plant when it spread along the bottom of the vessel.

The vessel is also filled with contaminated water more than 2 meters deep. If the camera cannot capture images inside the water, engineers plan to estimate the spread of the debris from data to be obtained by dosimeter.

Engineers are eager to find any information on fuel debris through these robotic surveys as it is crucial to advance decommissioning of the crippled plant.

February 25, 2017

DP wants to dismantle Fukushima No.2 (Daini)

DP plans bill to pull plug on aging Fukushima No. 2 nuclear plant

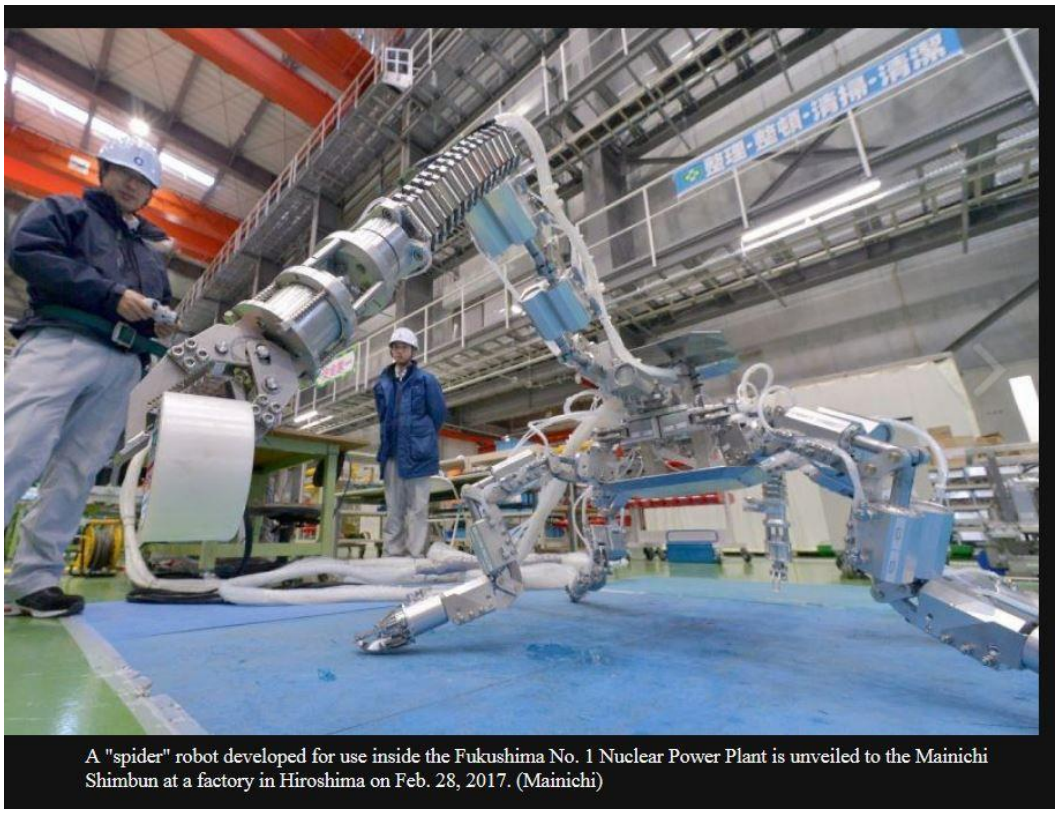
http://www.japantimes.co.jp/news/2017/02/25/national/politics-diplomacy/dp-plans-bill-pull-plug-aging-fukushima-no-2-nuclear-plant/

JIJI
The Democratic Party plans to submit a bill shortly to force the decommissioning of the Fukushima No. 2 nuclear power plant, it has been learned. The aging plant is about 10 km north of meltdown-hit Fukushima No. 1.
The bill will require the government to withdraw the No. 2 plant's operating permit unless Tokyo Electric Power Company Holdings Inc. requests a regulatory safety screening it within two years of the

bill becoming law, sources said Friday. That would force Tepco to either upgrade the plant's safety or shut it down.
The main opposition party intends to ask other opposition parties to support the bill with an eye to submitting it to the Diet by March 11, the sixth anniversary of the Great East Japan Earthquake and tsunami that tipped poorly protected Fukushima No. 1 into a triple core meltdown.
The Fukushima Prefectural Government is calling for the decommissioning of the No. 2 plant, but Tepco has not made a decision.
One hurdle facing the bill is the Japanese Trade Union Confederation (Rengo), which is the DP's largest supporter. Rengo supports nuclear power plant restarts.

March 1, 2017

New "muscle robots"



A "spider" robot developed for use inside the Fukushima No. 1 Nuclear Power Plant is unveiled to the Mainichi Shimbun at a factory in Hiroshima on Feb. 28, 2017. (Mainichi)

Factory unveils 'muscle robots' to be used in Fukushima nuke plant dismantling

http://mainichi.jp/english/articles/20170301/p2a/00m/0na/010000c

HIROSHIMA -- A factory here where so-called "muscle robots" to help decommission the Fukushima No. 1 Nuclear Power Plant are being developed was unveiled to the Mainichi Shimbun on Feb. 28.
The robot development project is a joint effort among Hitachi-GE Nuclear Energy Ltd., Hiroshima-based equipment maker Chugai Technos Corp., and other firms. The companies are aiming to use the robots -- which are powered by water pressure and springs, and thus unlikely to be affected by radiation -- to crush and remove nuclear fuel that melted down six years ago. The companies have developed six types of robot so far.
The machines unveiled on Feb. 28 include a six-limbed "spider" robot that can move around and transport objects. The robot is 2.8 meters long when the arms are fully extended, and the companies plan to give it the ability to hang from scaffolding and climb onto equipment.

Although surveys of the interior of the Fukushima plant reactors have been conducted, details on the state and location of the melted nuclear fuel remain sketchy. The "muscle robots" are still in their preliminary stages of development, and the companies say they will continue to tweak the devices to respond to the actual conditions inside the reactors as they become known.

See also:

In Photos: Factory unveils 'muscle robots' for Fukushima nuke plant

http://mainichi.jp/english/graphs/20170301/hpe/00m/0na/001000g/1

March 3, 2017

More creative thinking needed with robots

Fukushima No. 1 cleanup chief issues call for creative thinking to succeed with robot probes

http://www.japantimes.co.jp/news/2017/03/03/national/fukushima-no-1-cleanup-chief-creative-thought-needed-robot-probes-reactors/

AP
The head of decommissioning for the damaged Fukushima No. 1 nuclear plant said Thursday that more creativity is needed to develop robots that can locate and assess the condition of the reactors' melted fuel rods.
A robot sent inside the primary containment vessel of reactor 2 last month could not get as close to the core as was hoped because it was blocked by deposits believed to be a mixture of melted fuel and structural debris.
Naohiro Masuda, who heads the decommissioning unit of Tokyo Electric Power Company Holdings Inc., said he wants another probe sent in before deciding which methods to use to remove the reactor debris.
Reactor 2 is one of three units at the six-reactor plant that were tipped into core meltdowns after the 2011 earthquake and tsunami caused a complete loss of power at the aging plant.
Tepco needs to know exactly where the melted fuel is and details of the structural damage in each unit to figure out the best and safest ways to remove the radioactive fuel. The investigators must rely on remote-controlled robots to do the work because the radiation is too high for humans to survive.
Despite the incomplete probe missions, officials have said they want to stick to their schedule to determine the best removal methods this summer and start work in 2021.
Earlier probes have suggested that worse-than-anticipated challenges will likely slow the plant's cleanup, which is already expected to take decades. During the probe of reactor 2 in early February, the "scorpion" robot crawler stalled after reaching its radiation exposure limit in just two hours — one-fifth of what was anticipated.
"We should think out of the box so we can examine the bottom of the core and how melted fuel debris spread out," Masuda told reporters.
Probes are also being planned for the other two reactors. A tiny waterproof robot will be sent into reactor 1 in the coming weeks, while experts are still trying to figure out a way to access badly damaged reactor 3.
Tepco is struggling with the decommissioning process. The 2011 meltdowns forced tens of thousands of nearby residents to evacuate and many residents have been able to return home due to the high radiation levels.

Cleaning up communities outside of the plant is also a challenge. The cost has reportedly almost doubled to ¥4 trillion ($35 billion) from an earlier estimate.
On Thursday, police arrested an Environment Ministry employee for allegedly taking bribes from a local construction firm president, media reports said.

See also:

Fukushima cleanup chief urges better use of probe robot

http://www.asahi.com/ajw/articles/AJ201703020059.html

March 5, 2017

How will melted fuel be removed?

News Navigator: How will melted fuel at Fukushima plant be removed?

http://mainichi.jp/english/articles/20170305/p2a/00m/0na/007000c

The Mainichi answers common questions readers may have about how disaster-response workers plan to remove melted fuel from the disaster-stricken Fukushima No. 1 Nuclear Power Plant.

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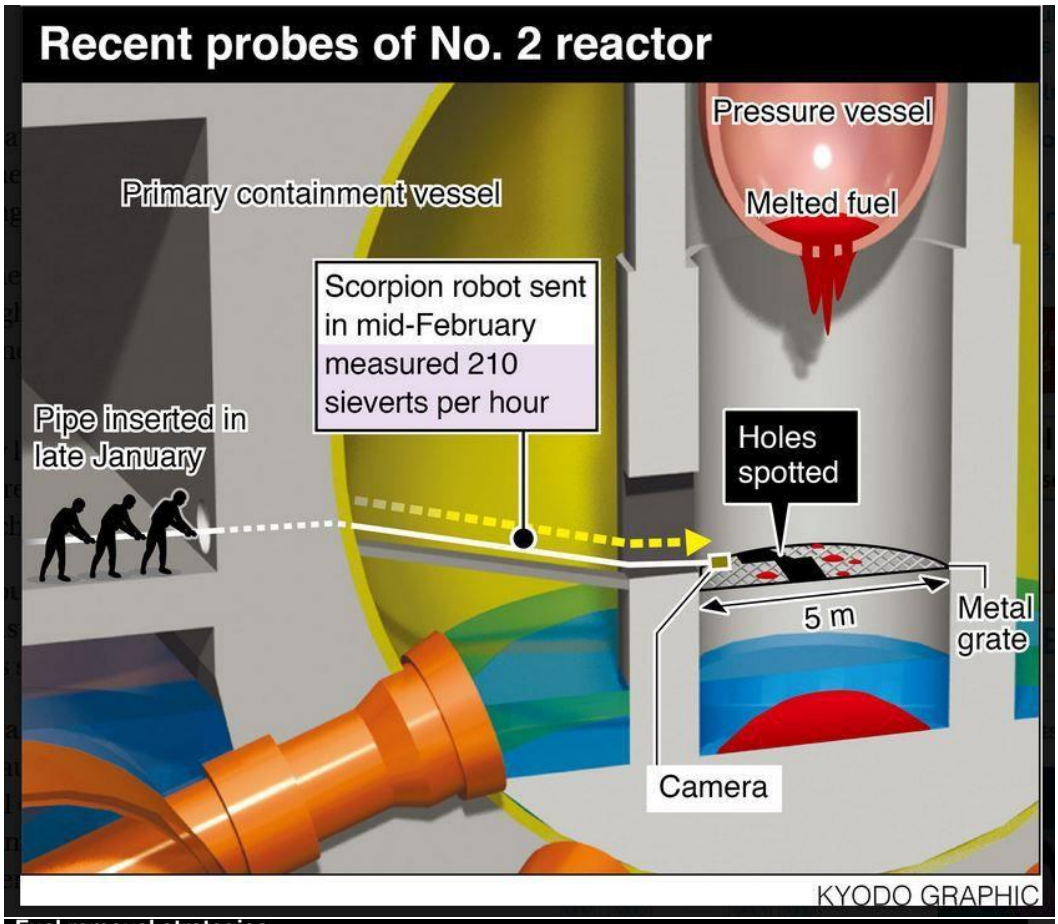
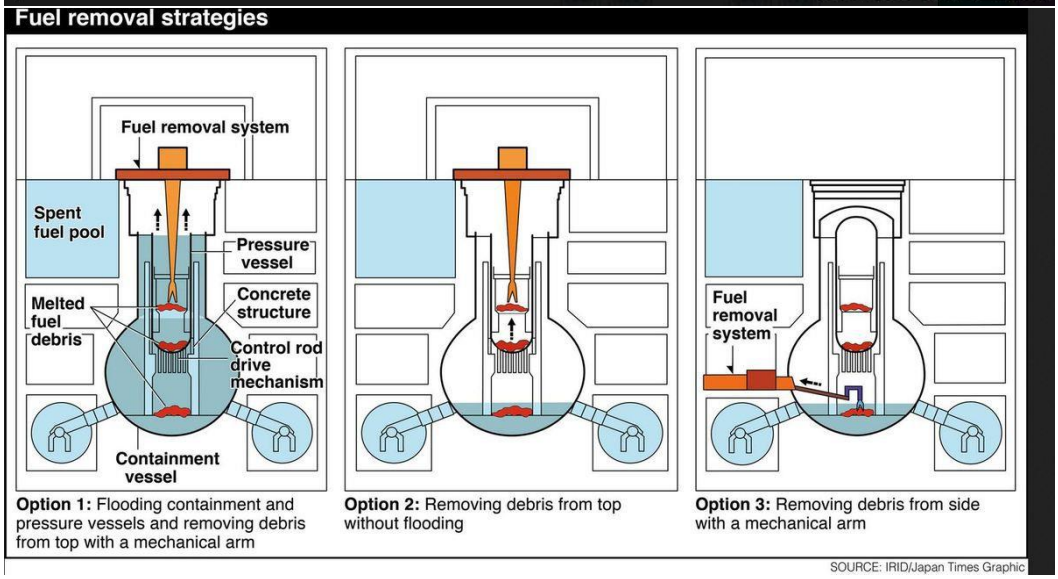
Question: What methods are being considered for removing the fuel?
Answer: Innovation will be needed in order to avoid exposing people to radiation, due to the high levels of radiation released from the fuel. One method under consideration is to fill the containment vessels holding the fuel with water, since water has radiation-blocking properties.
Q: Aren't the containment vessels ruptured?
A: Just like you can't fill a cup with water if it has a hole in it, the water-filling method won't work if the containment vessels are ruptured. If they are, then another possible method is removing the fuel from the air.
Q: Which way is better?
A: Both have advantages and disadvantages. The water method could require finding and patching holes in the containment vessels. The air method wouldn't need this, but could cause dust and other particles containing radiation to be released. The national government and plant owner Tokyo Electric Power Co. (TEPCO) will discuss as early as this summer about these two plans.
Q: What is the fuel like now?
A: At the time of the meltdown, the reactors at the plant were heated to over 2,000 degrees Celsius. The melted fuel is thought to have mixed with equipment in the plant, concrete and other materials, and to have cooled to a rock-like state. It will have to be cut out and removed.
Q: How will the fuel be cut loose?
A: The plan is to use a remotely-controlled robot. However, high-tech electronics using semiconductors are easily broken by radiation. There are ideas to make the robot use hydraulics or springs for its movement, to make it resistant to the radiation. Robot technology will be the key to a successful decommissioning of the reactors. (Answers by Mirai Nagira, Science & Environment News Department)

March 9, 2017

How to remove melted fuel





Tepco's biggest hurdle: How to remove melted fuel from crippled Fukushima reactors

http://www.japantimes.co.jp/news/2017/03/09/national/tepcos-biggest-hurdle-remove-melted-fuel-crippled-fukushima-reactors/#.WMF3S_KlSos

by Kazuaki Nagata

Six years after the triple meltdown at the Fukushima No. 1 nuclear power plant, recent investigations underneath the damaged reactor 2 using cameras and robots came close to identifying melted fuel rods for the first time.
Experts say getting a peek inside the containment vessel of reactor 2 was an accomplishment. But it also highlighted how tough it will be to further pinpoint the exact location of the melted fuel, let alone remove it some time in the future.
The biggest hurdle is the extremely lethal levels of radiation inside the containment vessel that not only prevent humans from getting near but have also crippled robots and other mechanical devices.
Safely removing the melted fuel would be a best-case scenario but the risks and costs should be weighed against the option of leaving the melted fuel in the crippled reactors, some experts said.
"The work to probe inside the containment vessels and remove the fuel debris will be extremely tough because of the high radiation levels," said Hiroshi Miyano, who heads a panel of the Atomic Energy Society of Japan, which is discussing ways to decommission the Fukushima plant and making recommendations to the government.
The government and Tokyo Electric Power Company Holdings Inc. are trying to find a way to remedy the situation but existing methods and technologies may not be sufficient, Miyano said.

In search of melted fuel

The world's attention turned to the melted fuel rods in late January when Tepco inserted a 10-meter-plus tube equipped with a camera into the containment vessel of reactor 2 to capture images under the pressure vessel that housed the fuel rods.
The images showed black lumps scattered beneath the pressure vessel.
When the March 11, 2011, Great East Japan Earthquake and monstrous tsunami hit, the plant suffered a blackout and lost its key cooling system, triggering meltdowns in reactors 1, 2 and 3. The melted nuclear fuel rods penetrated the pressure vessels and fell into the containment vessels.
Tepco had put cameras inside the containment vessels several times in the past six years but January's probe was the first to apparently find melted fuel debris.
"We understand that this is a big milestone. We could finally get to see what it was like underneath the pressure vessel," said Yuichi Okamura, general manager of Tepco's nuclear power and plant siting division.
"This is critical information in order to remove the fuel debris."

Radiation barrier

But Tepco hasn't confirmed that the black lumps are melted fuel, saying they could be paint or cable wrappings, and further investigation is needed.
Capturing the images may be progress but the robot and camera forays have not provided enough information about how to deal with the melted fuel.
Last month, Tepco sent a remote-controlled, scorpion-shaped robot in to further probe inside the reactor 2 containment vessel. But the robot failed before it reached under the pressure vessel after a tire became stuck.
The robot's dosimeter measured radiation levels of 210 sieverts per hour — enough to kill humans instantly.
While 210 sieverts per hour indicate the melted fuel was nearby, the radiation crippled the robot's electronics, including its semiconductors and cameras, indicating that the further use of robots to pinpoint the melted fuel will be difficult, robotics experts said.
There are computer chips "designed to withstand a certain level of radiation, but the level inside the containment vessel is totally different," said Satoshi Tadokoro, a professor at Tohoku University who is an expert on disasters and rescue robots.

The radiation can damage a robot's chips that serve as their brains, causing the devices to lose control, said Tadokoro, whose robots have also been used at the Fukushima plant.
"On top of the high level of radiation, the entrance (to the containment vessel) for the robot is very small," restricting what types of robots can be used to hunt for the melted fuel, he said.
Tepco said the opening it created on the side of the reactor 2 containment vessel is about 11 cm in diameter.

Fuel removal strategy

Tepco is set to conduct internal probes of the reactor 1 containment vessel this month and is preparing similar missions for reactor 3.
The government and utility then plan to adopt a basic fuel removal strategy this summer and fine-tune the plan next year, with the actual fuel removal taking place in or after 2021.
There are essentially three options for the strategy, according to the Tokyo-based International Research Institute for Nuclear Decommissioning (IRID), which is developing technologies for the Fukushima plant decommission.
One option is to flood the containment vessels with water and use a crane above the reactors to hoist up the melted fuel. The second option is to carry out the same process but without water. The third is to install removal equipment through the side of the containment vessel.
There are merits and drawbacks to each option, said Shoji Yamamoto, who heads the team developing technologies to create the fuel removal devices at IRID.
The flooding option can block radiation using water, but if the fuel melts into the water, it could pose a risk of recriticality. The debris may need to be cut into pieces for removal, but this process would enable water to get between multiple pieces, creating the condition for recriticality. For nuclear chain reactions to happen there needs to be a certain distance between nuclear fuel and water.
If there is no water, the recriticality risk is minimal but the massive radiation levels cannot be blocked, Yamamoto said.
Tepco's Okamura said being able to block radiation with water is a huge plus, but noted the reactor 2 containment vessel had cracks and holes that could let injected coolant water escape.
With the Three Mile Island nuclear accident in the U.S., the flooding option was used to retrieve the melted fuel in the 1980s. But the key difference was that all of the melted fuel stayed inside the pressure vessel, so it was easier to flood the reactor.
Because the melted fuel in reactors 1, 2 and 3 at the Fukushima plant all penetrated the pressure vessels and fell into the containment vessels, extracting it from the top or the side was a tough call, Yamamoto said, noting it was important to know the exact location of the melted fuel.
The distance between the top of the pressure vessel and the bottom of the containment vessel is about 45 meters and some parts inside the pressure vessels will need to be removed if Tepco tries to remove the debris inside the containment vessels from the top.
"If we know that the melted fuel is concentrated in the containment vessels, it will be more efficient to remove it from the side" because the entry point is closer, Yamamoto said.
Whatever option is decided, Yamamoto stressed that maintaining the fuel removal device will be difficult because the radiation will probably cripple it.
"The fuel removal device will be controlled remotely … it will be broken somewhere down the line and the parts will have to be replaced, considering its (ability to withstand) radiation," he said.
"Given that, maintenance will have to be done remotely, too, and that will be a big challenge."

To remove or not

Another option altogether is for Tepco to leave the melted fuel where it is.
During a media tour of the Fukushima No. 1 plant last month, Okamura of Tepco said the utility intended to collect the melted fuel because leaving it was "not an appropriate way" to manage nuclear fuel.

Miyano of the Atomic Energy Society of Japan said the debris must be removed because radioactive materials, including nuclear fuel, must be strictly controlled under international rules requiring strict monitoring.
Domestic nuclear power plant operators have to report the amount of nuclear fuel they have to the Nuclear Regulation Authority, which then reports to the International Atomic Energy Agency.
“There is the question of whether the government and Tepco decide not to remove the fuel debris. That would be an international issue,” said Miyano, adding that a consensus from the international community would be needed.
At the same time, Miyano said debate and analysis will be required to decide which choice would be best by looking at various factors, including how much it will cost to pick up all the melted fuel and where to store it.
This series looks at the lasting impact of the March 11, 2011, disasters.

Decommissioning heavy challenges

March 9, 2017

Engineers Face Big Challenges

https://www3.nhk.or.jp/nhkworld/nhknewsline/33/engineersfacebigchallenges/

- Yoshihito Kametani

Engineers are trying to solve one of the biggest challenges involved with decommissioning the crippled Fukushima Daiichi nuclear power plant. They need to invent machines that can remove the melted fuel rods.
Earlier this year TEPCO sent cameras into the containment vessel of the No.2 reactor. One image they recorded shows a steel grating covered in a yellowish substance, and some parts of the floor that have caved in. The findings surprised some experts.
"I did expect to see a hole on the floor, but there are details which I didn't imagine," says Toru Ogawa, director at the Collaborative Laboratories for Advanced Decommissioning Science. "We see so much of something, sticking all over the floor -- this is what I didn't expect."
But he says it's difficult to tell what it is.
TEPCO had hoped to locate melted nuclear fuel. Removing it will be the biggest hurdle in the decommissioning process, but they've admitted that they still aren't sure where it is.
"We have yet to come to any conclusion about the exact location of the melted fuel. We intend to examine the information we have collected up until now, and then we'll come up with a more detailed judgment," says Yuichi Okamura, a TEPCO official.
High radiation levels have prevented anyone from going inside the containment vessels in the reactor buildings.
Researchers, including at Mitsubishi Heavy Industries in western Japan, are rushing to develop robots to help workers involved in the decommissioning. The company is testing a 7-meter-long robotic arm that can be remotely controlled. It may eventually be used at the crippled plant. But there are still many challenges ahead.
"We need to carry out maintenance remotely in the event of trouble. That's one of the toughest challenges," says Kenichi Kawanishi, an official at the company. "The most important thing is to find out how much and to what extent the fuel melted and spread."
TEPCO will inspect another reactor this month to try to find clues about the whereabouts of the molten fuel. They'll send this new robot with a small camera to the bottom of the containment vessel.

video: New Decommission Technology

https://www3.nhk.or.jp/nhkworld/en/news/videos/20170309155839847/

A testing facility for decommissioning work in the town of Naraha, less than 20 kilometers from the Fukushima nuclear plant, is being used to help develop robots and virtual reality programs that will be used in the project.
The evacuation order was lifted in Naraha a year and a half ago, and the facility was built to help research how to decommission the crippled plant. It's run by the Japan Atomic Energy Agency, and all kinds of technologies are being brought in to come up with solutions for tackling the unprecedented nuclear accident.
Overcoming debris has been a hurdle for robots to do any work inside the reactor buildings. People can't go inside of those buildings yet because of the high radiation levels, so it's crucial for robots to find out what's really happening.
Some of the tests involve robots that can function under water. They will be needed to explore parts of the reactors that are immersed in water to keep the melted fuel rods cool.
It's still unclear exactly where the melted fuel is. Technology to uncover those details is being developed as well because that's a crucial part of the decommissioning.
Eventually, the day may come when human researchers are finally able to go inside the reactor buildings. In order to get ready for that moment -- a virtual reality system is a crucial part of the preparations.
By wearing special glasses, researchers can experience in 3 dimensions what it's like to actually move around inside the nuclear plant, avoiding poles and pillars that could get in the way when they try to bring in tools and equipment.
A lot of the work will be done in the dark at the Daiichi plant, which is why they practice moving around with a flashlight. Because of the high level of radiation inside, they have limited time to be inside, so at the top right hand corner of the screen in the simulation, participants can check how long they have been inside and how much radiation they have been exposed to.
The visuals used for training that we were shown are not what staff train with. There's another version that's actually based on data brought back by cameras they've sent into the reactor buildings at the Daiichi plant, but that version is classified.
Hiroyuki Daido, director of the Naraha Remote Technology Development Center, speaks with anchor Minori Takao.
Takao: What part of the reactor building have you recreated so far?
Daido: Stairways around the containment vessel. Getting closer to the core is important for decommissioning, and using robots for that process.
Takao: But we know that the radiation level is way too high there now. So this training is about years into the future. What needs to happen to get to that stage?
Daido: We need to continue to get more data about the state of the inside of the buildings. Our cameras are already giving us a clearer picture, so hopefully if we keep advancing our robots, the day humans can get inside will get closer.
Takao: Despite all of the unanswered questions surrounding the plant, people are trying to plan ahead, in order to keep the already heavy damage from the accident to a minimum.

Fukushima Daiichi after 6 years

Fukushima Daiichi 6 Years On

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NHK World's Ayako Sasa joins anchor Miki Yamamoto in the studio.

Yamamoto: The Fukushima Daiichi nuclear plant, on the Pacific coast more than 200 kilometers northeast of Tokyo, suffered one of the worst nuclear accidents in history after the March 2011 earthquake and tsunami. Workers are still struggling to contain the high levels of radiation and contaminated water there. Ayako, can you bring us up to speed on what's gone on at the plant since the disaster?
Sasa: The nuclear power plant is facing the ocean, and when the tsunami hit it caused massive damage to 4 reactor buildings and facilities. Three of them were damaged by hydrogen explosions, and reactors 1, 2 and 3 suffered meltdowns. To cool the reactors, water needed to be pumped in. They're still pumping water in today, and when it goes inside, it gets contaminated.
That water is then processed and is kept in storage tanks. There are around 1,000 of them. But what to do with all that contaminated water has not been decided. What's more, there's also underground water coming down from mountains in this direction and getting inside. Tokyo Electric Power Company is trying to prevent that water from getting in.
Yamamoto: This is where the ice wall comes in isn't it?
Sasa: That's right. Water runs down from the mountains to the ocean. It seeps through cracks in the buildings and it becomes contaminated -- tons of water floods into the buildings each day. The Japanese government and TEPCO decided to build an underground ice wall to block the water. They put long pipes into the ground and filled them with liquid coolant, which in turn freezes the soil between the pipes. The operation began last year and still isn't completed. The final part of the process needs approval and the nuclear watchdog is still studying what they think will happen when the wall is complete.
Yamamoto: The goal is to decommission the crippled plant. Can you talk about that process?
Sasa: Yes, when the meltdowns happened, nuclear fuel rods inside the reactors melted. TEPCO needs to find out what happened to that molten fuel and how much there is in order to figure out how to remove it. But here's the problem -- radiation levels are still too high for workers to get inside to see the damage for themselves. Because of this, they've sent in cameras and robots instead. Last month, the latest robot was sent in to measure the temperature, radiation and take pictures. It broke down and TEPCO gave up on it.
Yamamoto: Although research and development continue to get the answer, they still haven't found the exact location of the melted fuel rods and this is after 6 years. What's the timeline looking like for TEPCO?
Sasa: Decommissioning the Daiichi plant will take decades. And, the process is not only long but also complicated. The government and TEPCO are expected to decide this year on a broad outline for how to remove the melted fuel rods in. Their aim is to start removing it from one of the reactors in 2021, the whole process 30 to 40 years.
As for cost, the government says we can expect the price tag to quadruple from earlier estimates. That will bring things to about 70 billion dollars. The reason? The difficulty of the task and the lengthy period of time needed to do it. A project of this scale has never been done before.

March 10, 2017

New robot for new attempt into No.1

Tepco to send new robot into Fukushima reactor 1 in bid to find melted fuel

http://www.japantimes.co.jp/news/2017/03/10/national/tepco-send-robot-fukushima-reactor-1-bid-find-melted-fuel-collect-samples/#.WMLZ4_KlSos
Kyodo

The operator of the disaster-struck Fukushima No. 1 nuclear power plant will make a new attempt to examine the inside of reactor 1 on Tuesday with a remote-controlled robot.
The move, announced Thursday, follows a botched attempt with another self-propelled robot to look inside reactor 2, which also sustained a meltdown after the March 11, 2011, Great East Japan Earthquake and tsunami. That robot became unable to move when it encountered debris and eventually could not be retrieved.
The attempts are the first by Tokyo Electric Power Company Holdings Inc. to examine the insides of the wrecked reactors since the nuclear disaster unfolded.
For the reactor 1 inspection, Tepco said the new robot will carry out a four-day probe inside the containment vessel. Findings of the survey will be released on March 21.
Deposits of melted fuel in reactor 1 are believed to have penetrated the pressure vessel and melted through the containment vessel, which is supposed to hold the fuel.
The utility said the robot will enter the structure through a pipe connected to the containment vessel, and land on steel grating once used as a walkway for workers.
According to Tepco, as much as 2.5 meters of water — injected into the structure to cool the fuel — has accumulated in the bottom of the containment vessel.
If successful, the robot will drop from the walkway a dosimeter and underwater camera attached to remote control cables, to ascertain the extent of debris. It will also attempt to collect water and examine deposits.
The plant's reactors 1, 2 and 3 suffered core meltdowns due to the loss of cooling water in the world's worst nuclear catastrophe since the 1986 Chernobyl disaster.
The actual condition of the melted fuel remains unknown as radiation levels inside the reactors remain extremely high.

TEPCO to use 'fishing gear-like' robot to hunt for melted fuel at Fukushima nuke plant

http://mainichi.jp/english/articles/20170310/p2a/00m/0na/003000c

Tokyo Electric Power Co. (TEPCO) said it will send a fishing gear-like robot into the nuclear fuel containment vessel of the Fukushima No. 1 nuclear plant's No. 1 reactor on March 14 to examine the state of melted nuclear fuel.

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This will be the power company's latest in a series of attempts to find and examine nuclear fuel at the plant using robots. TEPCO plans to spend four days on the search in hopes of ascertaining the state of the fuel for the first time. The melted fuel is believed to be in the bottom of the containment vessel, where radioactively contaminated water has accumulated.
The rod-shaped robot measuring about 70 centimeters long will travel through the water inside the vessel after being dropped in on a cable -- like fishing -- through a gap in scaffolding at the site.

March 11, 2017

Decontamination work in Fukushima Pref. far from finished business

http://mainichi.jp/english/articles/20170311/p2a/00m/0na/027000c

FUKUSHIMA -- With six years having passed since the onset of the nuclear disaster at Tokyo Electric Power Co. (TEPCO)'s Fukushima No. 1 nuclear plant, the government's decontamination plan in this prefecture is fast approaching the end of its first phase at the end of March.

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As a consequence of the decontamination project -- and the fact that radioactive material decays over time -- radiation levels in Fukushima Prefecture have declined to some extent.
However, in certain areas of the prefecture, radiation levels continue to be high, and the issue of what to do with decontamination waste still needs to be tackled. The government does plan to carry out decontamination work in the neglected "difficult-to-return" evacuation zones in fiscal 2017, but local residents are skeptical that the end is near.
To date, the Environment Ministry has carried out decontamination work in 11 municipalities across the prefecture subject to evacuation orders. However, no decontamination has been done yet in the "difficult-to-return" zones. In other municipalities, where the radiation dose is 0.23 microsieverts per hour or higher, decontamination work has been performed by the relevant local government office.
Initially, the central government-led decontamination was supposed to finish in March 2014, but this was pushed back to March 2017, owing to delays related to makeshift storage sites for contaminated soil. The Environment Ministry plans to finish its decontamination work by the end of March 2017, after which it plans to move the contaminated soil to interim storage facilities.
In areas where the central government is in charge of decontamination, "follow-up" decontamination will also take place in the event that radiation levels do not drop enough, in the hope that residents will eventually be able to return home. Conversely, there will be no follow-up in cases where decontamination is being handled by a local authority, making local residents anxious.
Nevertheless, there are a few spots where follow-up decontamination has taken place in addition to the work in the 11 municipalities overseen by the government. There are nine such spots in total, and they are all in the city of Soma. The Soma Municipal Government initially intended to conduct decontamination in about 30 locations across the city, but this was eventually reduced to nine locations, owing to radiation level-related criteria for follow-up decontamination as instructed by the Environment Ministry.
A Soma Municipal Government representative stated, "Radiation levels are particularly high in forests here, and it is unknown what the future impact of this might be. I want to have a system set up whereby decontamination can be easily conducted again in the future, as necessary." (By Hanayo Kuno, Science & Environment News Department, Kazuhisa Soneda, Fukushima Bureau, Makoto Ogawa, News Layout Center, and Yohei Kanno, Visual Group)

March 12, 2017

NRT Focus: Decommissioning Fukushima Daiichi

https://www3.nhk.or.jp/nhkworld/en/news/editors/3/decommissioningfukushimadaiichi/

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Workers are still struggling to contain high levels of radiation and contaminated water at the Fukushima Daiichi nuclear power plant, as they work to decommission the facility 6 years after the disaster.

The plant is located on the Pacific coast, more than 200 kilometers northeast of Tokyo. It suffered one of the worst nuclear accidents in history after the quake and tsunami hit on March 11, 2011.

NHK World's Ayako Sasa joins anchors Aki Shibuya and Sho Beppu in the studio.

Shibuya: Ayako, can you bring us up to speed on what's gone on at the plant since the disaster?

Sasa: This is a model of the nuclear power plant. It's facing the ocean and when the tsunami hit it caused massive damage to 4 reactor buildings and facilities. Three of them were damaged by hydrogen explosions, and reactors 1, 2 and 3 suffered meltdowns. To cool the reactors, water needed to be pumped in. They're still pumping water in today, and when it goes inside, it gets contaminated.

That water is then processed and is kept in storage tanks. There are around 1,000 of them. But what to do with all that contaminated water has not been decided. What's more, there's also underground water coming down from mountains in this direction and getting inside.

Shibuya: Tokyo Electric Power Company is trying to prevent that water from getting in.

Sasa: That's right. This is where the Ice Wall comes in. Here's a look at the underground part of the plant. Water runs down from the mountains to the ocean. It seeps through cracks in the buildings and it becomes contaminated. Tons of water flood into the buildings each day.

The Japanese government and TEPCO decided to build an underground ice wall to block the water. They put long pipes into the ground and filled them with liquid coolant, which in turn freezes the soil between the pipes. The operation began last year and still isn't completed. The final part of the process needs approval and the nuclear watchdog is still studying what they think will happen when the wall is complete.

Shibuya: Of course, the goal is to decommission the crippled plant. Can you talk about that process?

Sasa: Yes. When the meltdowns happened, nuclear fuel rods inside the reactors melted. TEPCO needs to find out what happened to that molten fuel and how much there is in order to figure out how to remove it. But here's the problem. Radiation levels are still too high for workers to get inside to see the damage for themselves. Because of this, they've sent in cameras and robots instead. Last month, the latest robot was sent in to measure the temperature, radiation and take pictures. It broke down andTEPCO gave up on it.

Seeking Solutions

Yoshihito Kametani

While the picture of what's going on inside Daiichi remains murky, engineers are pushing ahead with trying to solve one of the biggest challenges. They need to invent machines that can remove the melted fuel rods.

Earlier this year, TEPCO sent cameras into the containment vessel of the No.2 reactor. An image shows a steel grating that's covered in a yellowish substance and some parts of the floor that have caved in. The findings surprised some experts.

"I did expect to see a hole on the floor, but there are details which I didn't imagine," says Toru Ogawa, director at the Collaborative Laboratories for Advanced Decommissioning Science. "We see so much of something, sticking all over the floor. This is what I didn't expect."

But he says it's difficult to tell what it is.

TEPCO had hoped to locate melted nuclear fuel. Removing it will be the biggest hurdle in the decommissioning process, but they've admitted that they still aren't sure where it is.

"We have yet to come to any conclusion about the exact location of the melted fuel. We intend to examine the information we have collected up until now, and then we'll come up with a more detailed judgment," says Yuichi Okamura, a TEPCO official.

High radiation levels have prevented anyone from going inside the containment vessels in the reactor buildings. Researchers, including at this company in western Japan, are rushing to develop robots to help workers involved in the decommissioning.

One machine may one day enter the crippled plant is a robotic arm about 7 meters long that can be remotely controlled. Engineers have just started testing it. But there are still many challenges ahead. "We need to carry out maintenance remotely in the event of trouble. That's one of the toughest challenges," says Kenichi Kawanishi, an official at Mitsubishi Heavy Industries. "The most important thing is to find out how much and to what extent the fuel melted and spread."
TEPCO will inspect another reactor this month to try to find clues about the whereabouts of the molten fuel. They'll send a new robot with a small camera to the bottom of the containment vessel.
Beppu: As we've just heard, although research and development continue to get the answer they still haven't found the exact location of the melted fuel rods and this is after 6 years. What's the timeline looking like for TEPCO?
Sasa: Decommissioning the Daiichi plant will take decades, and the process is not only long but also complicated. The government and TEPCO are expected to decide this year on a broad outline for how to remove the melted fuel rods. Their aim is to start removing them from one of the reactors in 2021 and to complete the whole process in 30 to 40 years.
As for cost, the government says we can expect the price tag to quadruple from earlier estimates. That will bring things to about 70 billion dollars. The reason? The difficulty of the task and the lengthy period of time needed to do it. A project of this scale has never been done before.
Please click on the URL to watch the report.
http://www3.nhk.or.jp/nhkworld/newsroomtokyo/aired/20170310.html

March 14, 2017

No1: Robot can't be seen on screen

TEPCO cancels robotic probe of reactor

https://www3.nhk.or.jp/nhkworld/en/news/20170314_31/

The operator of the Fukushima Daiichi nuclear power plant has cancelled Tuesday's operation to send a remote-controlled probe into the crippled No.1 reactor.

Tokyo Electric Power Company began preparations in the morning to send the robot into the containment vessel of the reactor to monitor melted nuclear fuel.

But the company called off the attempt after images on a camera placed outside of the containment vessel to monitor the robot could not be seen on screens in the control room.

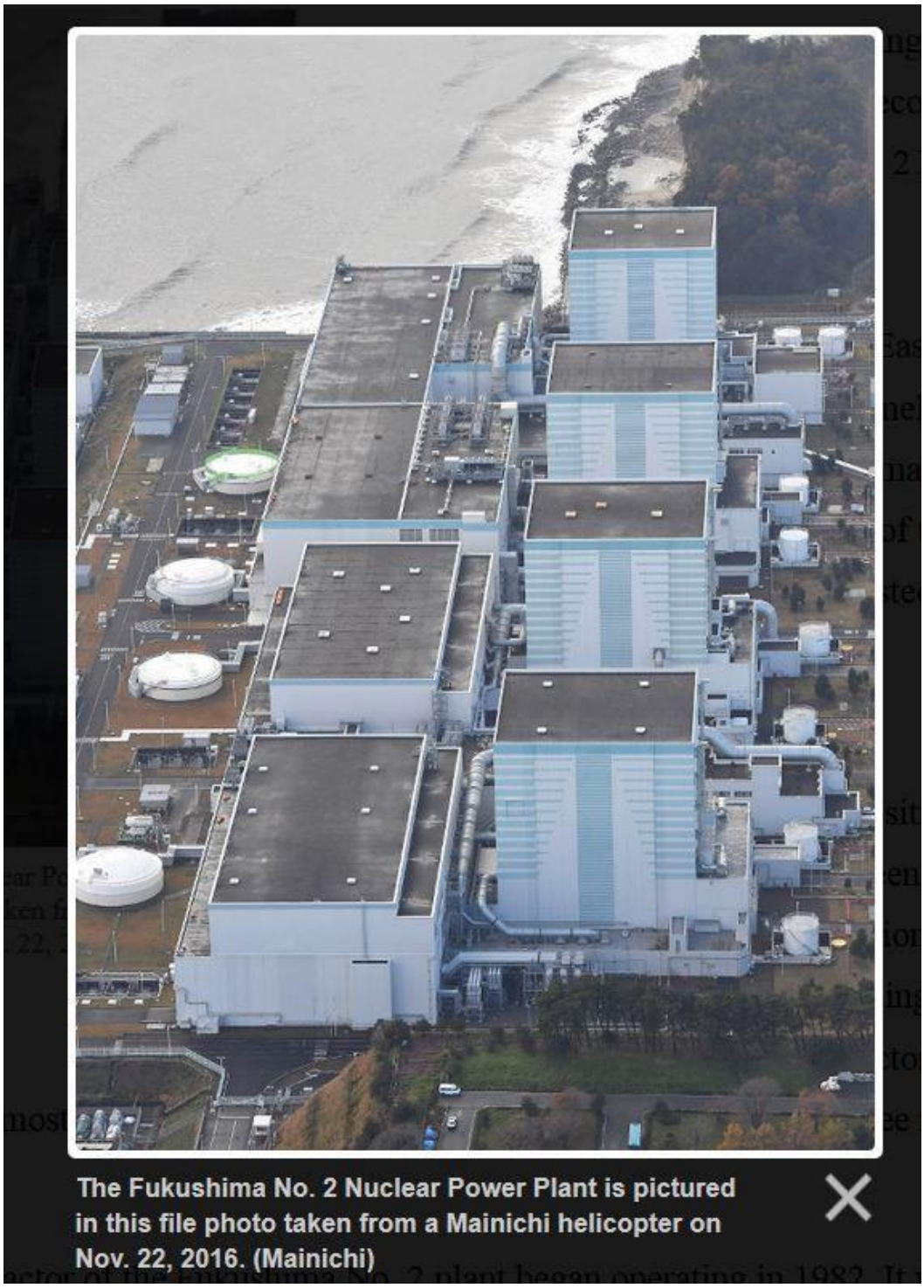
The company plans to investigate the cause of the problem and try again on Wednesday or later.

March 17, 2017

Decommissioning Fukushima Daiichi far from finished business

TEPCO to decommission 1 reactor at Fukushima No. 2 plant, mulling fate of 3 others

http://mainichi.jp/english/articles/20170317/p2a/00m/0na/024000c



The Fukushima No. 2 Nuclear Power Plant is pictured in this file photo taken from a Mainichi helicopter on Nov. 22, 2016. (Mainichi)

Tokyo Electric Power Company Holdings Inc. (TEPCO) has informally decided to decommission the No. 1 reactor at its Fukushima No. 2 Nuclear Power Plant, it has been learned.

In the wake of the March 2011 Great East Japan Earthquake and tsunami and ensuing meltdowns at the Fukushima No. 1 plant in Fukushima Prefecture, local bodies and residents of the area who suffered extensive damage requested that all four reactors at the No. 2 plant also be decommissioned.

TEPCO had avoided stating a clear position on the No. 2 plant's reactors, but there had been pressure from the government and ruling coalition for it to make a decision. The company accordingly decided to decommission the plant's No. 1 reactor, which suffered the most damage, and will consider what to do with the other three reactors in the future.

The No. 1 reactor of the Fukushima No. 2 plant began operating in 1982. It was flooded by tsunami on March 11, 2011, and all four reactors at the plant remain idled. The No. 2 plant suffered less damage than the No. 1 plant, and if it passed screening by the Nuclear Regulation Authority, its reactors could be restarted. But the Fukushima Prefectural Government and all 59 local assemblies have asked TEPCO and the government to decommission all reactors in the prefecture.

TEPCO has remained busy handling compensation claims relating to the Fukushima nuclear disaster and the disaster cleanup. If it were to decommission all of the No. 2 plant's reactors, they would lose value and it would have to write down huge losses. Company president Naomi Hirose has therefore avoided taking a clear position on the issue, saying, "I would like to consider it and make a decision as a business operator."

Last year, however, officials decided to create a fund to cover the huge cost of handling the nuclear disaster, which is expected to reach 21.5 trillion yen, nearly double the original prediction. There was accordingly pressure from the government for TEPCO to reach an early decision on the fate of the No. 2 plant's reactors.

The No. 1 reactor at the No. 2 plant is the oldest of the plant's four reactors. It temporarily lost its cooling functions in the March 2011 disaster, and suffered the most damage among the four reactors.

TEPCO believes that by limiting decommissioning to one reactor for the time being, it will be able to hold the decommissioning cost below 100 billion yen, minimizing the impact on company finances and on decommissioning work at the Fukushima No. 1 plant. However, a decision to decommission only one reactor at the No. 2 plant is unlikely to win public approval.

March 20, 2017

Should be easier this time...

A robot on March 18 took this image of a valve and a pipe in cooling water at the bottom of the containment vessel of the No. 1 reactor at the Fukushima No. 1 nuclear power plant. (Provided by the International Research Institute for Nuclear Decommissioning)

Clearer water should help find melted fuel at Fukushima plant

http://www.asahi.com/ajw/articles/AJ201703200028.html

Cooling water in the No. 1 reactor of the Fukushima No. 1 nuclear plant has improved in transparency, which should make it easier to pinpoint the location of melted nuclear fuel, the plant's operator said.
The improved transparency, compared with the level two years ago, was confirmed on March 18, when a research robot took an image that clearly showed a valve and a pipe in the water at the bottom of the reactor's containment vessel, Tokyo Electric Power Co. said March 19.
Devices on the robot measured radiation levels of 7.8 sieverts per hour on a metal stage for workers and 1.5 sieverts per hour in the water.
The research robot on March 20 and 21 will study areas where the melted nuclear fuel could exist.

March 22, 2017

Another failed mission?

Robot can't find melted fuel at No. 1 reactor of Fukushima plant

http://www.asahi.com/ajw/articles/AJ201703220046.html

What appears to be sand has piled up on a pipe at the bottom of the containment vessel of the No. 1 reactor at the Fukushima No. 1 nuclear power plant. This image was taken by a survey robot on March 20. (Provided by the International Research Institute for Nuclear Decommissioning)

Tokyo Electric Power Co. (TEPCO) extended the mission of a survey robot after it failed to locate melted nuclear fuel at the No. 1 reactor of the Fukushima No. 1 nuclear power plant.
The robot on March 20 was sent into the reactor's containment vessel, where the melted fuel is believed to have landed at the bottom, but pipes blocked its view, TEPCO said March 21.
The utility lengthened the period of research from four days to five days until March 22 to check other areas with high probabilities of melted fuel.
According to estimates, some of the melted nuclear fuel may have fallen into a cylinder-shaped structure that supports the pressure vessel, flowed out from the structure through a door for workers, and then spread at the bottom of the containment vessel.
The bottom of the containment vessel is covered with accumulated cooling water.

The survey on March 20 took place in an area about 1 meter from the door. The robot's measurement device, equipped with a camera and a dosimeter, was hung from a stage for workers and lowered into the water below.
Although the pipes blocked the view of the conditions at the bottom of the containment vessel, the camera took pictures of what appears to be sand piling up on the pipes.
The radiation level around the area in the water was 6.3 sieverts per hour.
"Judging from the radiation level, there is a high possibility that what is piling up on the pipes is not nuclear fuel," a TEPCO official said.

Robot probe of No.1 reactor to continue until Wed.

https://www3.nhk.or.jp/nhkworld/en/news/20170321_33/

The operator of the crippled Fukushima Daiichi nuclear power plant says a robotic survey of fuel debris at the No. 1 reactor is being hampered by plumbing and other structures. The utility says it will extend the probe by one day, until Wednesday.

So far engineers have detected strong radiation of about 11 sieverts per hour in the water inside the containment vessel.

Tokyo Electric Power Company on Saturday started sending a remote-controlled robot into the reactor's containment vessel to look at the state of debris -- a mixture of melted fuel and reactor parts. The robot is equipped with a camera and a dosimeter.

The melted fuel is believed to still be at the bottom of the vessel, where about 2 meters of contaminated water accumulates.

TEPCO released the results of the ongoing survey on Tuesday. It said the robot moved to a location believed to be just above the debris and lowered the camera and dosimeter into the accumulated water.

The dosimeter detected radiation of 6 sieverts per hour one meter from the bottom. But piping prevented the device from reaching deeper, and it has yet to confirm the debris.

TEPCO also said the robot recorded about 11 sieverts of radiation per hour about 30 centimeters from the vessel's bottom at another location. Officials believe the radiation may be coming from contaminated fragments that fell to the bottom, as they expected no debris there.

Through the extended probe, TEPCO hopes to collect more data on conditions inside the vessel.

TEPCO welcomes the challenge

This is what TEPCO was writing on Feb. 15, 2017

Fukushima Daiichi NPS Prompt Report 2017

http://www.tepco.co.jp/en/press/corp-com/release/2017/1377951_10469.html

Fukushima Daiichi NPS Prompt Report (Feb 15, 2017)NEW CHALLENGE: TEPCO will send "SCORPION" robot into Fukushima Daiichi Unit 2 PCV for further investigation.

Following up on a telescopic probe and obstacle removal robot, TEPCO will insert a new robot which looks like a scorpion to further investigate inside the Unit 2 PCV. This is a new challenge for TEPCO that the robot will try to obtain information on the reactor by getting visual image and measuring temperature and radiation level.
Ideally, TEPCO needs to identify where the melted fuels are located inside the reactor in order to research and develop the technology to remove the fuels. And this will also welcome more progressively on international collaboration and partnerships.
Scorpion shaped robot is a "symbol" of new challenge that TEPCO is going to face for the decommissioning the site. The information which will be obtained from its cameras will allow TEPCO to further understand the condition of the Unit 2.
In addition, investigation will be held in a safe manner that robot will be inserted inside the PCV and the radiation will remain at the same area.
Every step is a new challenge for TEPCO but TEPCO welcomes the challenge. There are lessons to be learned every day. But "technology" such as robots are constantly evolving. And TEPCO will keep moving forward.

11 Sieverts/hour but no melted fuel yet

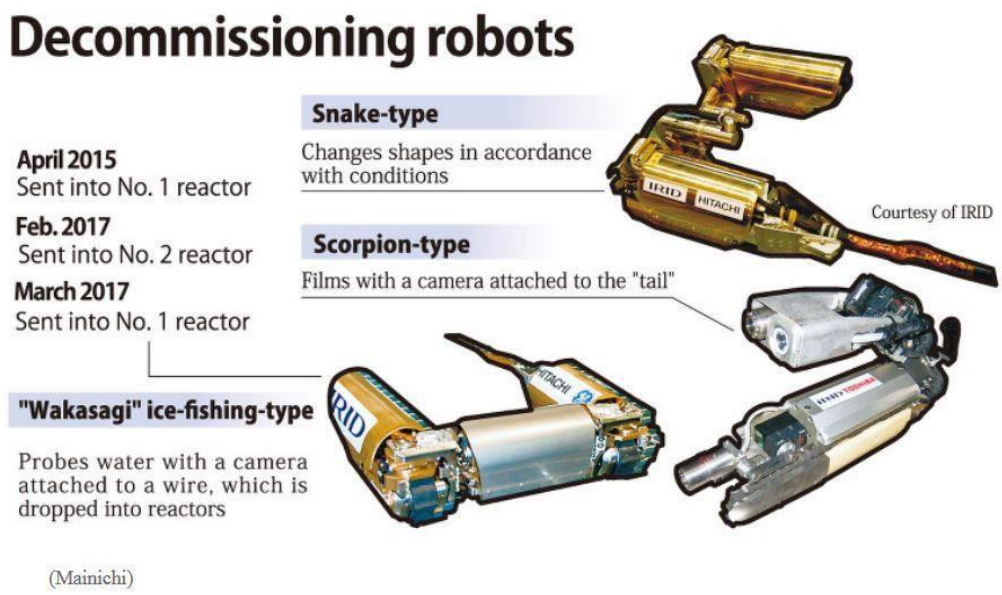
Robot probe finds lethal radiation levels in water near bottom of Fukushima reactor 1 vessel

JIJI
http://www.japantimes.co.jp/news/2017/03/22/national/robot-probe-finds-lethal-11-sieverts-water-near-bottom-fukushima-reactor-1-vessel/#.WNInmGdFeos

A radiation level of 11 sieverts per hour has been detected in tainted water inside a reactor containment vessel at the Fukushima No. 1 nuclear power plant, Tokyo Electric Power Company Holdings Inc. said Tuesday.
The reading was measured in a survey using a robot on Sunday at a point about 30 cm from the bottom of the containment vessel of reactor 1.
The reading is the highest radiation level detected in water inside the containment vessel. If exposed to this level of radiation, a person would likely die in about 40 minutes.
The survey showed the accumulation of sandy substances at the bottom of the vessel, but Tepco said it does not believe they are melted nuclear fuel.
Nuclear fuel melted from the reactor's pressure vessel is believed to have accumulated in contaminated water at the bottom of the containment vessel. No such debris has been found so far.
Reactors 1, 2 and 3 at the plant suffered meltdowns in March 2011 after it was hit by a massive earthquake and tsunami.
On Monday, a radiation level of 6.3 sieverts per hour was detected in water at a point about 1 meter from the bottom of the containment vessel, where Tepco had seen possible fuel debris.
Sandy substances and something that resembled melted fuel were found there but Tepco said it was not fuel debris.
A radiation level of 1.5 sieverts per hour was monitored on Saturday in water at another point 1 meter above the bottom of the containment vessel.
Tepco decided to extend the survey by one day through Wednesday to look for melted fuel.

April 9, 2017

Decommissioning & robots: Trial and error



Robots expected to play key role in Fukushima decommissioning, but challenges remain

https://mainichi.jp/english/articles/20170408/p2a/00m/0na/023000c

As decommissioning work at Tokyo Electric Power Co. (TEPCO)'s Fukushima No. 1 Nuclear Power Plant continues, remote control robots are expected to play an important role in the decommissioning process. However, it is impossible to ignore the fact that the development of these robots faces huge challenges, such as high levels of radiation within the nuclear reactors, as well as a lack of information.
Among the robots that have been designed to carry out decommissioning work is the "muscle robot." Developed by Hitachi-GE Nuclear Energy, Ltd., the body and limbs of the muscle robot can be controlled with a device that one might typically find attached to a video game console. Another type of robot acts like a crab with claws that can be used to grasp metallic pipes and snap them using a blade positioned on one of its claws. These robots are also able to smash concrete, using a special drill that can be placed at the end of the arm -- like something out of a Hollywood movie.
Looking ahead, the government and TEPCO are aiming to start removing the melted nuclear fuel inside the No. 1 to No. 3 reactors at the Fukushima No. 1 nuclear plant in 2021, after announcing exactly how they plan to do so over the summer. Although knowledge regarding the matter is limited, it seems that the melted nuclear fuel in the reactors has cooled and solidified, and the prototypes of the robots have been produced based on the assumption that the devices need to break down and remove such hardened fuel.
The robots' parts are connected together with springs, and are driven using hydraulic power. One of the main advantages of this system is that they are hardly affected by radiation. There are six types of robot in total, such as the "spider-style" robot which has six arms and legs (length 2.8 meters, width 2 meters, weight 50 kilograms), as well as a "tank-style" robot (length 4.35 meters, width 63 centimeters, weight 700 kilograms), which runs on a conveyor belt. The tank-style robot is capable of

lifting objects weighing up to 50 kilograms. A representative from Hitachi-GE Nuclear Energy states determinedly, "I want the muscle robots to remove the melted nuclear fuel."
However, the process will not be plain sailing. While the bodies of these robots are resistant to radiation, their cameras are somewhat vulnerable. It has been found that the electronic hardware in the cameras breaks easily after being exposed to radiation. For example, when a "cleaning robot" was sent into the No. 2 reactor on Feb. 9, 2017, the camera broke after about two hours after being exposed up to an estimated 650 sieverts per hour of radiation. The camera part of the robot is essential because without it, images cannot be transmitted back to the control room.
To solve this problem, ideas such as placing a metallic plate near the camera that would block out radiation have been discussed, but it is feared that this would make the robot heavier and interfere with its operations. As a Hitachi representative states, "If one were to use an analogy to describe the current development stage in human terms, then we have entered elementary school. We'd like to continue our work, believing we can develop usable robots." It is clear that a trial-and-error process is very much underway, as the robot developers try their best to achieve perfection.
It will not be an easy road though. Hajime Asama, professor at the University of Tokyo and a member of the Technology Advisory Committee of the International Research Institute for Nuclear Decommissioning (IRID), states, "Robots are usually developed based on confirmation of what exactly lies in the reactors. However, in the case of the No. 1 power plant, no matter how hard you try to predict what is in there, there are often unexpected elements waiting."
In the No. 2 reactor, a "scorpion-style robot" was sent in on Feb. 16, as a follow-up to the cleaning robot but it got trapped by deposits on the conveyor belt, and came to a halt. The presence of these kinds of deposits was unexpected at the stage when the robot was being designed. Too much is still unknown about the situation inside the reactors, making robot design difficult. Later this month, a "wakasagi ice fishing-type robot" is expected to be placed inside the No. 1 reactor, but it is feared that the same problems that were experienced in the No. 2 reactor will emerge once again.
In recent years, the use of artificial intelligence has been expected to play a key role but a number of unexpected problems have made progress in this area difficult. What is needed is technology that can be controlled remotely by people with flexible judgment. However, professor Asama believes that, "The reactors inside the No. 1 plant are full of unknown challenges. We have no choice but to use our available knowledge to create robots that can deal with these problems."

April 19, 2017

Decommissioning approved for 5 reactors

Decommissioning plans for 5 reactors approved

https://www3.nhk.or.jp/nhkworld/en/news/20170419_18/

Japan's nuclear regulator has approved plans submitted by operators of 4 power plants to decommission 5 aging nuclear reactors. The reactors are to be scrapped in a process lasting up to nearly 30 years.

The Nuclear Regulation Authority approved the plans at a meeting on Wednesday.

Under a government policy introduced after the 2011 nuclear accident at the Fukushima Daiichi plant, reactor lifespan was limited to 40 years in principle.

In 2015, utility companies decided to dismantle the 5 reactors. The 5 include **2 reactors at the**

Mihama plant and one at the Tsuruga plant, both in Fukui Prefecture, one at the Shimane plant in Shimane Prefecture and one at the Genkai plant in Saga Prefecture.

The plans call for first decontaminating pipes and dismantling facilities that are free of radioactive contamination.

The operators assume that the reactors and their buildings will be taken down and removed by fiscal 2045 at the latest.

At issue is where to put control rods, reactor parts and other radioactive waste. No site for a final disposal facility has been designated.

The regulator is checking another decommissioning plan for a reactor at the Ikata plant in Ehime Prefecture. The facility's operator decided last year to dismantle it.

Nuclear authority approves decommissioning plans for 5 aging reactors

https://mainichi.jp/english/articles/20170419/p2g/00m/0dm/079000c

TOKYO (Kyodo) -- Japan's nuclear authority approved decommissioning plans for five aging reactors at four power plants on Wednesday, the first such approvals since a government regulation was implemented after the 2011 Fukushima disaster to stop the operation of reactors beyond 40 years.
The five reactors are the Nos. 1 and 2 units at Kansai Electric Power Co.'s Mihama plant in Fukui Prefecture, the No. 1 unit at Japan Atomic Power Co.'s Tsuruga plant in Fukui Prefecture, the No. 1 unit at Chugoku Electric Power Co.'s Shimane plant in Shimane Prefecture and the No. 1 unit at Kyushu Electric Power Co.'s Genkai plant in Saga Prefecture.
While the utilities indicated it will take about 30 years to complete the decommissioning of each reactor, the disposal sites for the radioactive waste from the facilities have yet to be determined.
The decommissioning work will involve removing spent fuel from pools, dismantling reactors and demolishing surrounding facilities.
The regulation brought in following the 2011 disaster at Tokyo Electric Power Co.'s Fukushima Daiichi plant prohibits nuclear reactors from operating for over 40 years in principle, but the Nuclear Regulation Authority can approve the operation of a unit for up to 20 more years if the operator makes safety upgrades and the unit passes screening.
It was decided in March 2015 to scrap the five reactors, mainly due to profitability, as huge amounts of additional investment would be needed to meet the new safety requirements to keep the reactors operating beyond 40 years.
Meanwhile, the authority has given approval for the extended operation of the No. 3 unit at Kansai Electric's Mihama plant as well as the Nos. 1 and 2 units at its Takahama plant in Fukui Prefecture, which are also around 40 years old.
The authority is currently examining Shikoku Electric Power Co.'s decommissioning plan for the No. 1 unit at the Ikata plant in Ehime Prefecture, after the utility decided in March 2016 to scrap the reactor.
In Wednesday's meeting, the authority also decided that Japan Nuclear Fuel Ltd.'s uranium enrichment facility in the village of Rokkasho, Aomori Prefecture, satisfies regulatory requirements, virtually giving a green light for its operation. The decision will become official after consultation with the industry minister.
It will become the second fuel plant to clear new regulatory requirements after Global Nuclear Fuel-Japan Co.'s plant in Kanagawa Prefecture.

May 10, 2017

TEPCO must set funds aside for decommissioning purposes

Tepco mandated to create fund for scrapping Fukushima plant

http://www.japantimes.co.jp/news/2017/05/10/national/tepco-mandated-create-fund-scrapping-fukushima-plant/#.WRNqD9ykKic

Kyodo
The Diet passed a bill Wednesday requiring Tokyo Electric Power Company Holdings Inc. to put aside extra funds to decommission its crisis-hit Fukushima nuclear power plant, as the state seeks to gain more financial control over the utility.
Under the revised law, the state-backed Nuclear Damage Compensation and Decommissioning Facilitation Corp. will also be involved in the decommissioning process.
Currently, Tepco has been using profits to pay for scrapping the Fukushima No. 1 plant, which was destroyed after a 2011 earthquake and tsunami triggered a triple meltdown.
The revised law is expected to take effect later this year. **With the estimated cost of the decommissioning work already surging to ¥8 trillion from the previously forecast ¥2 trillion, a government panel has called for setting up a funding system that is not dependent on the company's financial health.**
The government projects the total cost to deal with the Fukushima nuclear disaster will reach ¥21.5 trillion, including decommissioning costs, compensation and decontamination work.
Under the new program, the state-backed organization will decide on the amount Tepco should store away each business year and the industry minister must approve it.
The utility must also formulate a financial plan and obtain the minister's approval when it uses the reserve fund for its decommissioning work.
The new law will strengthen the monitoring power of authorities as well, enabling the industry ministry and the organization to conduct on-site inspections to check whether Tepco is putting aside the money.
The government has a major say in the utility's operations after acquiring 50.1 percent of the company's voting rights. Tepco faces huge compensation payments and decommissioning costs among other problems due to the 2011 disaster.
The industry ministry has projected roughly ¥300 billion will be needed annually for the next 30 years to complete the scrapping of the power plant, which involves the difficult procedure of extracting nuclear debris.
The costs could grow further. A study by a Tokyo-based private think tank has shown the bill for the decommissioning could balloon to between ¥11 trillion and ¥32 trillion assuming materials from the No. 1 to 3 reactors, which suffered core meltdowns, need to be specially treated for radioactive waste.
The Japan Center for Economic Research estimated the total cost of managing the disaster could reach ¥70 trillion, more than three times the government calculation.

June 2, 2017

Scale down Kashiwazaki-Kariwa plant, says Niigata Mayor

Mayor to link reactor decommissioning to restarting 2 others at same TEPCO plant

https://mainichi.jp/english/articles/20170602/p2a/00m/0na/002000c

KASHIWAZAKI, Niigata -- The mayor of this city, home to the idled Kashiwazaki-Kariwa Nuclear Power Plant, said he intends to demand at least one of five reactors at the plant be decommissioned as a precondition for restarting two others.

- 【Related】TEPCO gave inaccurate explanations about seismic capacity of nuke plant
- 【Related】New gov't bill would make TEPCO reserve funds for Fukushima plant decommissioning
- 【Fukushima & Nuclear Power】

"I'm not assuming that all seven reactors will be in operation," Mayor Masahiro Sakurai told a regular news conference on June 1.
This is the first time that the mayor has mentioned specifically the possible decommissioning of reactors at the power station.
Mayor Sakurai said, "There are growing worries for local residents," citing the insufficient strength of the power station's special quake-proof building that will serve as a headquarters in the event of an emergency and North Korea's firing of missiles.
Sakurai suggested it is inevitable to scale down the Kashiwazaki-Kariwa plant. "Considering the Fukushima nuclear accident, seven reactors are too many," he said.
At the same time, the mayor emphasized that he does not intend to demand that all of the No. 1 to 5 reactors at the plant be shut down as a precondition for reactivating the No. 6 and 7 units, for which the Nuclear Regulation Authority is conducting safety inspections.
He said he will offer to leave a decision on which reactors will be decommissioned to plant operator Tokyo Electric Power Co. (TEPCO) and the national government, and urged these entities to present a decommissioning plan within two years.
Mayor Sakurai also said he believes that businesses related to the reactor decommissioning will help revitalize the local economy.
In response to the mayor's comments, a TEPCO official said, "We haven't heard anything directly from the Kashiwazaki Municipal Government. We'd like to continue to listen to their opinions on us."

June 28, 2017

Ikata No.1 to be scrapped

Plan to decommission Ikata No.1 reactor approved

https://www3.nhk.or.jp/nhkworld/en/news/20170628_21/

Japan's nuclear regulators have approved a roughly 40-year plan to decommission an aging nuclear reactor in Ehime Prefecture, western Japan.

The Nuclear Regulation Authority made the decision on Wednesday. Shikoku Electric Power Company, which operates the Ikata nuclear plant, decided last year to scrap its No.1 reactor.

This is in line with government guidelines introduced after the 2011 Fukushima Daiichi nuclear accident that limit reactor operation to 40 years in principle.

Under the plan, the reactor and the building that houses it will be dismantled and removed over the next 4 decades.

The work is to begin with removal of radioactive substances from pipes and other items, and

disassembly of uncontaminated equipment.

But the utility has yet to decide how to dispose of highly contaminated parts like the reactor's control rods, which amount to around 3,000 tons of radioactive waste.

The reactor is the 6th in Japan authorized for decommissioning after reaching the 40-year limit.

July 5, 2017

How to extract fuel debris

Fuel debris extraction plan for crippled Fukushima reactors to be revealed soon: sources

http://www.japantimes.co.jp/news/2017/07/05/national/group-mulls-fukushima-no-1-melted-fuel-debris-extraction-without-filling-containment-vessels-water/#.WV0-elFpyos

Kyodo
A state-backed entity is close to completing a plan for decommissioning the crisis-hit Fukushima nuclear power plant, detailing for the first time how it hopes to extract fuel debris from three reactors, sources said.
The Nuclear Damage Compensation and Decommissioning Facilitation Corp., tasked with providing technical support for decommissioning the complex, may propose a method to remove nuclear debris without completely filling the reactor containment vessels with water, the sources said Tuesday.
The plan means the debris inside reactors 1, 2 and 3 at the crippled Fukushima No. 1 complex is likely to be shaved off gradually with a drill or laser equipment as a shower of water is poured remotely, the sources said.
Filling reactor containment vessels with water before removing the debris is seen as effective in blocking the spread of radiation, but the entity decided not to adopt the approach because they fear water may leak from the damaged structures, the sources said.
In the method currently being weighed, some debris would remain in the air during the operation, posing a major challenge in efforts to block radiation and prevent debris from flying off, the sources said.
While debris has yet to be directly confirmed and information on exact locations and conditions is limited, the extraction work — the most difficult part of the decommissioning project — is expected to

proceed in stages from the side of the bottom part of each reactor containment vessel, the sources said.
Based on the plan, the government and the plant operator, Tokyo Electric Power Company Holdings Inc., are expected to determine a course of action for each reactor building this summer, possibly reviewing a road map for decommissioning the entire complex as well, the sources added.
Decommissioning the crippled reactors is expected to take at least 30 to 40 years.
The current road map calls for a debris-extraction plan for each reactor by this summer, with a detailed plan for at least one of the units ready in the first half of fiscal 2018. Extraction work would begin in 2021.
Following a magnitude 9.0 earthquake in March 2011, tsunami waves inundated the six-reactor plant, located on ground 10 meters above sea level, flooding power supply facilities. Reactor cooling systems were crippled and reactors 1, 2 and 3 suffered fuel meltdowns, while hydrogen explosions damaged the buildings housing reactors 1, 3 and 4.
At least 150,000 people in Fukushima were forced to live as evacuees amid radiation fears. While some have returned to their homes, Tepco and the government face enormous challenges in scrapping the reactors.
The Nuclear Damage Compensation and Decommissioning Facilitation entity was established after the crisis, the worst nuclear disaster since Chernobyl, to help the utility pay damages. The state-backed entity holds a majority stake in Tepco.

July 14, 2017

Cleanup requires release of (contaminated) water into sea

TEPCO chair: Treated water must be released into sea

http://www.asahi.com/ajw/articles/AJ201707140020.html

THE ASSOCIATED PRESS
The new chairman of Tokyo Electric Power Co. says the utility needs to stop dragging its feet on plans to dump massive amounts of treated but contaminated water into the sea and to make more money if it's ever going to succeed in cleaning up the mess left by meltdowns more than six years ago at the tsunami-hit Fukushima No. 1 nuclear power plant.
Takashi Kawamura, an engineer-turned-business leader who previously headed Hitachi's transformation into a global conglomerate, is in charge of reviving TEPCO and leading the cleanup at the Fukushima No. 1 plant. In an interview Thursday with selected media, Kawamura said despite the massive costs of the cleanup and meeting tighter safety requirements, nuclear power is still vital for Japan's national security.
Below are highlights from the interview, where Kawamura spoke in Japanese:

CLEANUP REQUIRES RELEASE OF WATER
Massive amounts of radiation-contaminated water that has been processed and stored in hundreds of tanks at the plant are hindering decommissioning work and pose a safety risk in case another massive quake or tsunami strikes. TEPCO needs to release the water--which contains radioactive tritium that is not removable but considered not harmful in small amounts--into the Pacific Ocean, Kawamura said.
The method is favored by experts at the International Atomic Energy Agency and Japan's Nuclear Regulation Authority as the only realistic option. Earlier, TEPCO had balked at calls by NRA chairman Shunichi Tanaka for controlled release of the water, now exceeding 770,000 metric tons, into the sea, fearing a public backlash. "Technically, we fully support the chairman's proposal," he said, adding that

there is still strong resistance from local residents, especially fishermen. "I think we should have acted sooner. ... We should start moving faster."

PROFITS NEEDED

Kawamura says TEPCO must become more profitable to manage to cover the gargantuan costs of cleaning up Fukushima No. 1 after it suffered multiple meltdowns due to the massive March 11, 2011, earthquake and tsunami. TEPCO'S longtime status as a regional monopoly undermined its profit-making incentive, hobbling its ability to cover most of the 21.5 trillion yen (about $190 billion) price tag for decommissioning the plant and compensating dislocated residents. "To reconstruct Fukushima, we must make more profit, and I know we should not be taking about just money, but I think that is important," he said.

DECOMMISSIONING IS THE FUTURE

TEPCO's main mission now is decommissioning Fukushima No. 1, an unprecedented challenge that experts say could take decades and will take still more research and development. "That's our main activity and gaining new expertise in the decommissioning is far more important. But I believe there will be a time when decommissioning becomes an important business," Kawamura said. "Decommissioning is a process which takes time, not only for accident-hit reactors but ordinary retired reactors," he said. "I plan to coordinate with those who are studying the possibility of properly turning decommissioning of ordinary reactors into a viable business."

JAPAN NEEDS NUKES

Kawamura says he believes nuclear power is still a viable business and one that will continue to be vital for Japan's energy security, despite the extra costs from stricter post-Fukushima safety requirements and the cost of processing spent fuel and waste. TEPCO is reviewing its business strategy, but based on rough estimates, "I still believe that nuclear is still superior for Japan, which is really a resource-poor country," he said. "Even if we take severe accident measures and factor in spent fuel processing and other costs, I think there are some reactors that can still be profitable." He said nuclear power includes a wide range of technologies that Japan should not abandon, for national security reasons, as China continues to build nuclear plants.

TEPCO'S OTHER REACTORS

Kawamura said TEPCO hopes to restart the utility's Kashiwazaki-Kariwa nuclear plant in northern Japan, even while the decommissioning at Fukushima No. 1 is under way, so the operable plant can be a major source of revenue for the company. He said a decision on whether to resume operation of the Fukushima No. 2 plant, near Fukushima No. 1, will depend on a financial review. He said he regrets TEPCO's slowness in making a decision and acknowledged calls from local authorities and residents to decommission the second Fukushima plant, which was also hit by the tsunami but avoided a meltdown.

July 19, 2017

New robot deployed at No.3 reactor

Tepco deploys new robot into Fukushima No. 1 reactor to locate fuel debris

http://www.japantimes.co.jp/news/2017/07/19/national/tepco-sends-new-type-robot-fukushima-no-1-reactor-search-fuel-debris/#.WXBnElFpyos

KAZUAKI, NAGATA – Tokyo Electric Wednesday sent a submersible robot into the primary containment vessel of the No. 3 reactor at the Fukushima No. 1 nuclear plant to probe for the exact location of melted fuel debris.

The first day of the operation, which lasted for about three hours, failed to find the fuel. Still, engineers and technicians learned the inside of the structure was quite damaged, Tokyo Electric Power Company Holdings Inc. said in an evening news conference.

"This was the first time that a robot has entered the containment vessel of reactor 3," said Takahiro Kimoto, a Tepco spokesman. "We think this is a big step."

He said the first day's mission was to see what conditions were like and whether it was possible for the robot to move deeper into the vessel's waters, where the company believes the fuel debris has fallen.

Video recorded by the robot showed scattered debris inside the structure. The utility also said steel gratings in the vessel designed to work as a scaffolding under regular circumstance were not where they should have been, which engineers could not explain.

Still, the company is hopeful the robot will be able to travel to deeper levels in the next phase of the probe scheduled for Friday, said Kimoto. The water level inside the No. 3 containment vessel is about 6 meters deep.

The cylindrical 30-cm robot, which was developed by Toshiba Corp., is equipped with a 180 degree-capable camera whose angle can be controlled and another fixed camera on its rear. Toshiba has been heavily involved with the Fukushima decommissioning process.

The mega-earthquake and massive tsunami on March 11, 2011 knocked out power in Fukushima, causing core meltdowns in the No. 1, No. 2 and No. 3 reactors. The heated fuel rods melted and then penetrated their pressure vessels to apparently fall to the bottom of the surrounding containment vessels.

Tepco deployed different robot types to investigate inside the containment vessels at the No. 1 and No. 2 reactors in January and March, respectively. But they failed to find any fuel debris.

Locating the exact location of the fuel is a crucial step to devise a way to remove debris and ultimately to scrap the crippled Fukushima plant.

July 20, 2017

Robot Probes Nuclear Reactor (NHK video)

https://www3.nhk.or.jp/nhkworld/en/news/videos/20170720150021660/

Swimming robot probes Fukushima reactor to find melted fuel

https://mainichi.jp/english/articles/20170720/p2g/00m/0dm/032000c

TOKYO (AP) -- An underwater robot entered a badly damaged reactor at Japan's crippled Fukushima nuclear plant Wednesday, capturing images of the harsh impact of its meltdown, including key structures that were torn and knocked out of place.

Plant operator Tokyo Electric Power Co. said the robot, nicknamed "the Little Sunfish," successfully completed the day's work inside the primary containment vessel of the Unit 3 reactor at Fukushima, which was destroyed by a massive March 2011 earthquake and tsunami.

TEPCO spokesman Takahiro Kimoto praised the work, saying the robot captured views of the underwater damage that had not been previously seen. However, the images contained no obvious sign of the melted nuclear fuel that researchers hope to locate, he said.

The robot was left inside the reactor near a structure called the pedestal, and is expected to go deeper inside for a fuller investigation Friday in hopes of finding the melted fuel.

"The damage to the structures was caused by the melted fuel or its heat," Kimoto told a late-night news conference held nine hours after the probe ended its exploration earlier in the day.

The robot, about the size of a loaf of bread, is equipped with lights, maneuvers with five propellers and collects data with two cameras and a dosimeter. It is controlled remotely by a group of four operators.

The robot was co-developed by Toshiba Corp., the electronics and energy company charged with helping clean up the plant, and the International Research Institute for Nuclear Decommissioning, a government-funded consortium.

It was on a mission to study the damage and find the fuel that experts say has melted, breached the core and mostly fallen to the bottom of the primary containment chamber, where it has been submerged by highly radioactive water as deep as 6 meters (20 feet).

The robot discovered that a grate platform that is supposed to be below the reactor core was missing and apparently was knocked down by melted fuel and other materials that fell from above, and that parts of a safety system called a control rod drive were also missing.

Remote-controlled robots are key to the decades-long decommissioning of the damaged plant, but super-high levels of radiation and structural damage have hampered earlier probes at two other reactors at the plant.

Japanese officials say they want to determine preliminary methods for removing the melted nuclear fuel this summer and start work in 2021.

Scientists need to know the fuel's exact location and understand the structural damage in each of the three wrecked reactors to work out the safest and most efficient ways to remove the fuel.

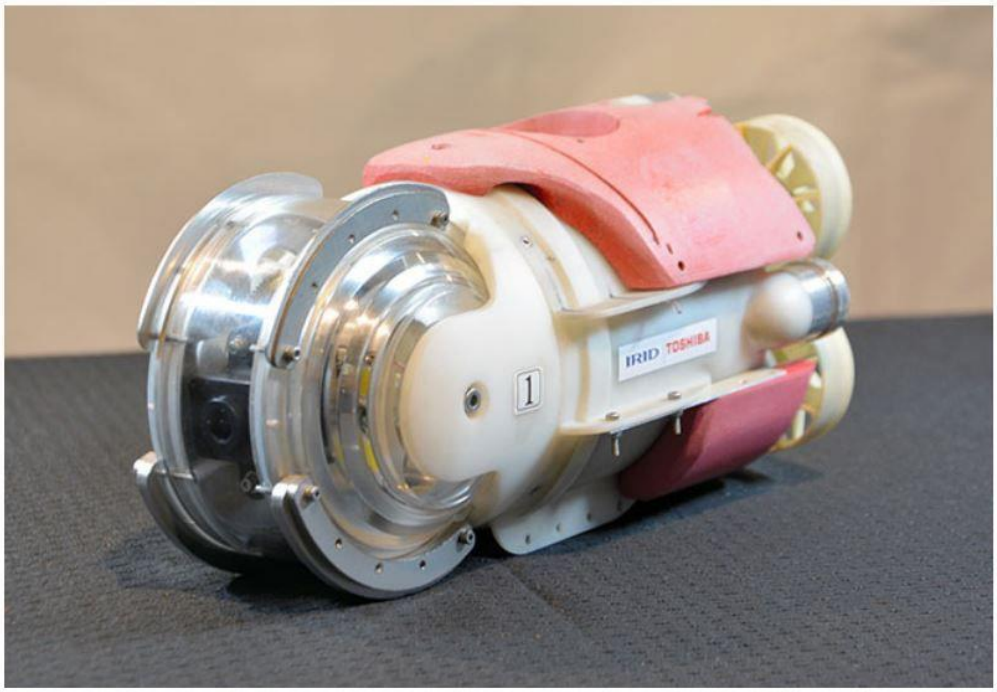
Robots tested earlier became stuck inside the two other reactors. A scorpion-shaped robot's crawling function failed and it was left inside the plant's Unit 2 containment vessel. A snake-shaped robot designed to clear debris for the scorpion probe was removed after two hours when its cameras failed due to radiation levels five times higher than anticipated.

The robot used Wednesday was designed to tolerate radiation of up to 200 sieverts -- a level that can kill humans instantly.

Kimoto said the robot showed that the Unit 3 reactor chamber was "clearly more severely damaged" than Unit 2, which was explored by the scorpion probe.

July 21, 2017

Potential fuel debris hanging as icicles



An underwater robot surveying the No. 3 reactor of the Fukushima No. 1 nuclear power plant (The Asahi Shimbun)

Possible 'icicle' of melted fuel spotted at Fukushima plant

http://www.asahi.com/ajw/articles/AJ201707210036.html

An icicle that appears to be melted nuclear fuel has been seen hanging from the bottom of the pressure vessel of the No. 3 reactor at the crippled Fukushima No. 1 nuclear power plant, sources said.
Tokyo Electric Power Co., the plant's operator, confirmed the presence of what is believed to be fuel debris on July 21 with an underwater robot equipped with a camera, the sources said.
If the icicle is confirmed to be fuel debris, it will become valuable data in the investigation to determine the cause of the accident, triggered by the March 2011 Great East Japan Earthquake and tsunami, and efforts to decommission the reactor.
The survey of the No. 3 reactor conducted so far has found that most of the nuclear fuel apparently melted and fell through a hole at the bottom of the pressure vessel.
On July 21, TEPCO deployed the underwater robot into the No. 3 reactor's containment vessel, which holds the pressure vessel, from early in the morning to look into the area below the pressure vessel.
When the robot entered the area, its camera showed what seems to be fuel debris hanging like an icicle from a hole at the bottom of the pressure vessel.

Fukushima robot finds potential fuel debris hanging like icicles in reactor 3

http://www.japantimes.co.jp/news/2017/07/21/national/fukushima-robot-finds-potential-fuel-debris-hanging-like-icicles-reactor-3/#.WXNFQFFpyos

Staff Report, Bloomberg
Tokyo Electric has said that a remotely controlled robot investigating the inside of reactor 3 at the Fukushima No. 1 power plant has finally spotted objects that could be fuel debris — a potential milestone in the effort to clean up one of the worst atomic disasters in history.

This is the first time Tepco has found something likely to be melted fuel. When the utility sent a different robot into reactor 2 in January, it found black lumps sticking to the grating in the primary containment vessel but said they were difficult to identify.

The objects spotted this time look like icicles hanging around a control rod drive attached to the bottom of the pressure vessel, which holds the core, Tokyo Electric Power Company Holdings Inc. said at an evening news conference Friday.

Enclosed by the huge primary containment vessel, the pressure vessel originally contained the fuel rod assemblies. But the rods melted into a puddle and burned through its bottom once the plant lost power after being swamped by the monstrous tsunami of March 11, 2011.

The robot also captured images of lumps of material that appear to have melted and resolidified near the wall of the pedestal, a concrete structure that supports the pressure vessel.

“From the pictures taken today, it is obvious that some melted objects came out of the reactor. This means something of high temperature melted some structural objects and came out. So it is natural to think that melted fuel rods are mixed with them,” said Takahiro Kimoto, a Tepco spokesman.

“In that sense, it is possible that the melted objects found this time are melted fuel debris or probably around it,” he said, adding the utility will think about how they can be analyzed to determine if they are the former fuel rods.

Fuel from a nuclear meltdown is known as corium, a mixture of fuel rods and other structural materials.

“It is important to know the exact locations and the physical, chemical, radiological forms of the corium to develop the necessary engineering defueling plans for the safe removal of the radioactive materials,” said Lake Barrett, a former official at the U.S. Nuclear Regulatory Commission who was involved with the cleanup at the Three Mile Island nuclear power plant in the U.S. “The recent investigation results are significant early signs of progress on the long road ahead.”

Because of the high radioactivity in the reactor, only specially designed robots can probe the unit. And the unprecedented nature of the Fukushima disaster means that Tepco is pinning its efforts on technology not yet invented to get the melted fuel out of the reactors.

The utility aims to decide on the procedure for removing the melted fuel from each unit as soon as this summer. And it will confirm the procedure for the first reactor during fiscal 2018 ending in March 2019, with removal slated to begin in 2021.

Decommissioning the reactors will cost ¥8 trillion ($72 billion), according to an estimate in December from the Ministry of Economy, Trade and Industry. Removing the fuel is one of the most important steps in the cleanup, which may take as long as 40 years.

The significance of Friday's finding "might be evidence that the robots used by Tepco can now deal with the higher radiation levels, at least for periods of time that allow them to search parts of the reactor that are more likely to contain fuel debris," M.V. Ramana, professor at the Liu Institute for Global Issues at the University of British Columbia, said by email.

"If some of these fragments can be brought out of the reactor and studied, it would allow nuclear engineers and scientists to better model what happened during the accident," Ramana said.

The utility began probing reactor 3 on Wednesday. Since the PCV has 6 meters of water in it, which is higher than in reactors 1 and 2, the 30-cm robot will have to go deep under water.
The robot has two cameras — one on the front that can pivot 180 degrees vertically, and another on its back.

July 22, 2017

First step of decommissioning?

Material that appears to be nuclear fuel debris hangs like an icicle from the bottom of the pressure vessel of the No. 3 reactor at the Fukushima No. 1 nuclear power plant. (Provided by the International Research Institute for Nuclear Decommissioning)

Images of fuel debris 1st step in deactivating Fukushima plant

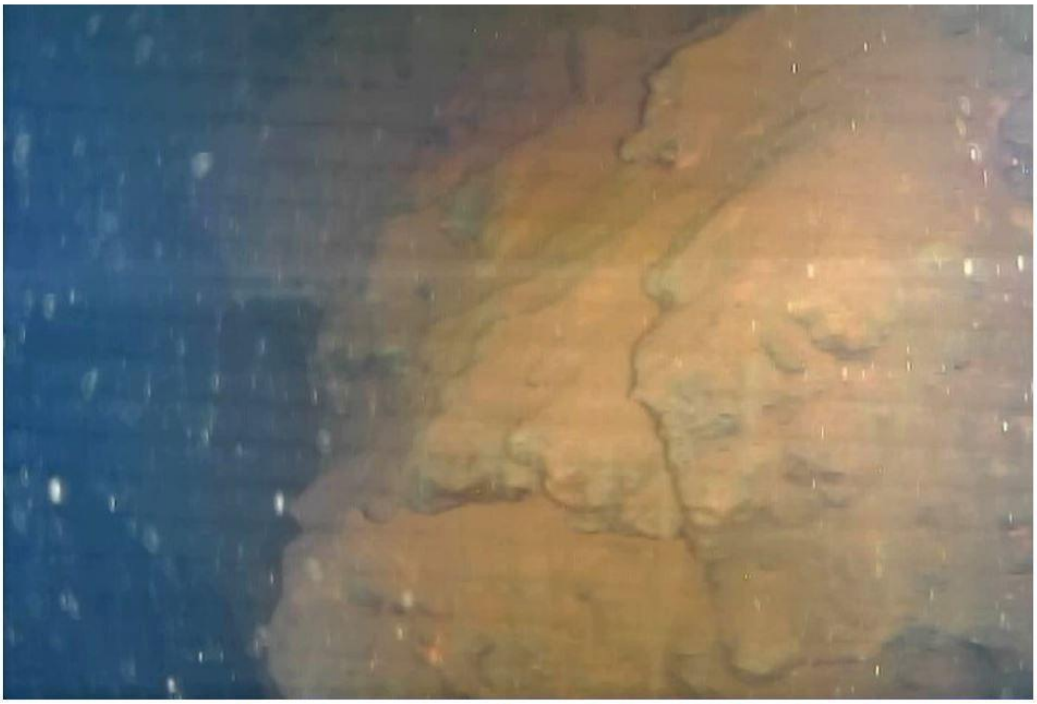
http://www.asahi.com/ajw/articles/AJ201707220018.html

The discovery of apparent icicle-shaped melted nuclear fuel within a reactor at the stricken Fukushima No. 1 nuclear power plant could be an important first step toward decommissioning the facility.

Images taken July 21 by a submersible robot that was remotely controlled to a position directly under the pressure vessel of the No. 3 reactor showed what appeared to be fuel debris that had melted through the vessel and later solidified, hanging like an icicle from the bottom of the pressure vessel. Another pile of solidified material had also accumulated like lava on a structure below the vessel. The material was orange and gray.
The images provided the first confirmation of sizable amounts of solidified material although robots have been sent into three reactors at the No. 1 plant. In other "expeditions," high radiation levels crippled the robot activity and prevented further study.
Operator Tokyo Electric Power Co. said the manner in which the solidified material was found within the No. 3 reactor suggested the material is fuel debris.
"It clearly appears to be something that solidified after melting out of the pressure vessel," said one official. "We believe the material emerged after nuclear fuel mixed with structural matter within the pressure vessel."
Past analysis of the No. 3 reactor led to the assumption that almost all the nuclear fuel had dropped through the pressure vessel after burning a hole in the bottom and dripping down. The latest robot survey confirms that is what likely happened.
TEPCO officials plan to deploy the submersible robot July 22 to an even greater depth within the containment vessel that holds the pressure vessel. It aims to ascertain the amount of fuel debris that has spread at the bottom of the containment vessel.
Images taken by the robot over the two days of study will be analyzed, along with other data, to gain a firmer understanding of what the material is.
That could prove important in deciding how to proceed with decommissioning.

Possible melted fuel seen for first time at Fukushima plant

https://mainichi.jp/english/articles/20170722/p2g/00m/0dm/003000c#cxrecs_s



This image captured by an underwater robot provided by International Research Institute for Nuclear Decommissioning shows lava-like lumps believed to contain melted fuel inside the Unit 3 reactor at Fukushima Dai-ichi nuclear plant in Okuma town, northeastern Japan, on July 21, 2017. (International Research Institute for Nuclear Decommissioning via AP)

TOKYO (AP) -- An underwater robot captured images of solidified lava-like rocks Friday inside a damaged reactor at Japan's crippled Fukushima nuclear plant, spotting for the first time what is believed to be nuclear fuel that melted six years ago.

Plant operator Tokyo Electric Power Co. said the robot found large amounts of lava-like debris apparently containing fuel that had flowed out of the core into the primary containment vessel of the Unit 3 reactor at Fukushima. The plant was destroyed by a massive earthquake and tsunami in March 2011.

Cameras mounted on the robot showed extensive damage caused by the core meltdown, with fuel debris mixed with broken reactor parts, suggesting the difficult challenges ahead in the decades-long decommissioning of the destroyed plant.

Experts have said the fuel melted and much of it fell to the chamber's bottom and is now covered by radioactive water as deep as 6 meters (20 feet). The fuel, during meltdown, also likely melted its casing and other metal structures inside the reactor, forming rocks as it cooled.

TEPCO spokesman Takahiro Kimoto said it was the first time a robot camera has captured what is believed to be the melted fuel.

"That debris has apparently fallen from somewhere higher above. We believe it is highly likely to be melted fuel or something mixed with it," Kimoto said. He said it would take time to analyze which portions of the rocks were fuel.

In an earlier survey Wednesday, the robot found severe damage in the vessel, including key structures that were broken and knocked out of place.

The robot, nicknamed "the Little Sunfish," on Friday went inside a structure called the pedestal for a closer look. TEPCO plans to send the robot farther down on Saturday in hopes of finding more melted fuel and debris.

Experts have said the melted fuel is most likely to have landed inside the pedestal after breaching the core.

Kimoto said the robot probe in its two missions has captured a great deal of useful information and images showing the damage inside the reactor, which will help experts eventually determine a way to remove the melted fuel, a process expected to begin sometime after the 2020 Tokyo Olympics.

"It's still just the beginning of the (decades-long) decommissioning. There is still a long way to go, including developing the necessary technology," he said. "But it's a big step forward."

Locating and analyzing the fuel debris and damage in each of the three wrecked reactors is crucial for decommissioning the plant. The search for melted fuel in the two other reactors has so far been unsuccessful because of damage and extremely high radiation levels.

The submersible robot, about the size of a loaf of bread, is equipped with lights, maneuvers with five propellers and collects data with two cameras and a dosimeter. It is controlled remotely by a group of four operators. It was co-developed by Toshiba Corp., the electronics, nuclear and energy company charged with helping clean up the plant, and the International Research Institute for Nuclear Decommissioning, a government-funded consortium.

Images show possible fuel debris

https://www3.nhk.or.jp/nhkworld/en/news/20170722_04/

Engineers at the Fukushima Daiichi nuclear power plant are working to scrap the facility's damaged reactors. For the first time, they've found what's likely to be fuel debris in one of them.

The engineers have been trying to locate molten fuel in the No.3 reactor. The fuel is thought to have melted and fallen to the bottom of the containment vessel.

They lowered a submersible robot into the 6-meter-deep cooling water in the vessel. The image sent

back by the robot shows an orange substance on a device that operates the fuel control rods. Objects shaped like icicles are also visible.

The engineers plan to use the robot to look for fuel debris at the bottom of the containment vessel.

Removing the molten fuel from the reactors is the biggest hurdle to decommissioning them.

July 23, 2017

Decommissioning will be a formidable task

Melted nuke fuel images show struggle facing Fukushima plant

http://www.asahi.com/ajw/articles/AJ201707230012.html

By KOHEI TOMIDA/ Staff Writer

Images captured on July 22 of solidified nuclear fuel debris at the bottom of a containment vessel of the crippled Fukushima No. 1 nuclear power plant show the enormity of decommissioning of the facility.
Plant operator Tokyo Electric Power Co. said it will closely study the images from the No. 3 reactor's containment vessel to determine the spread and amount of nuclear fuel debris.
After analysis, TEPCO will decide on a policy to retrieve the fuel debris.
The government and TEPCO plan to start the retrieval process in one of the three crippled reactors at the plant from 2021.
It will be a formidable task, given that a method of recovering debris that is stuck to the floor has yet to be considered.
The recent images were taken by a submersible robot, which was sent into the containment vessel on July 19, 21 and 22.
The No. 3 reactor's containment vessel is filled with water to a depth of 6.4 meters.
On the final day, the remote-controlled robot was dispatched to the deepest part of the containment vessel.
The images showed that pieces that fell from the structure and deposited material accumulated to a height of about 1 meters at the bottom of the containment vessel.
In particular, what is believed to be nuclear fuel debris is scattered in the form of rocks in the area directly beneath the pressure vessel.
The latest investigation has confirmed TEPCO's assumption made through analyses that most of the reactor's nuclear fuel melted through the pressure vessel and accumulated at the bottom of the containment vessel.
It also discovered that the nuclear fuel debris has spread throughout the containment vessel.
The images marked the first confirmation through a robot probe of a large amount of nuclear debris in any of the embattled No. 1 through No. 3 reactors.

July 24, 2017

Deposits in reactor likely to be fuel debris

https://www3.nhk.or.jp/nhkworld/en/news/20170724_27/

The operator of the damaged Fukushima Daiichi nuclear power plant released video footage on Monday of what is likely to be melted fuel debris.

Tokyo Electric Power Company, or TEPCO, found the solidified lumps during a robot inspection of the containment vessel of Fukushima's wrecked No. 3 reactor. The 3-day survey ended on Saturday.

TEPCO had earlier only made public still images from the probe. The 4-minute video shows black or grey lumps hanging down close to a structure just below the reactor.

The lava-like lumps are piled in layers, a phenomenon unknown before the accident.

TEPCO officials say the debris is probably melted nuclear fuel mixed with broken reactor parts.

In addition to metal scaffolding and other structural components, rocks and sand-like sediment can be seen getting stirred up by the movement of the robot.

The government and TEPCO plan further analysis of the footage in order to determine methods for removing the debris.

July 25, 2017

TEPCO releases new footage

TEPCO releases video of 'nuclear debris' at Fukushima plant

http://www.asahi.com/ajw/articles/AJ201707250039.html

By KOHEI TOMIDA/ Staff Writer

Footage released by Tokyo Electric Power Co. on July 24 shows what is believed to be nuclear fuel debris. The lumps are scattered at the bottom of the containment vessel of the No. 3 reactor at the Fukushima No. 1 nuclear power plant. (Video provided by the International Research Institute for Nuclear Decommissioning)

What is believed to be nuclear fuel debris scattered inside a reactor of the crippled Fukushima No. 1 nuclear power plant can be clearly seen in video footage released by Tokyo Electric Power Co. on July 24.

The four-minute video shows nuclear fuel debris dispersed in an area measuring about 5 meters in diameter directly beneath the No. 3 reactor's pressure vessel. The video comes from 16 hours' footage filmed by a remote-controlled submersible robot during a survey by plant operator TEPCO on July 19, 21 and 22.

The released video also shows craggy-shaped material that appears to be nuclear fuel debris hanging like an icicle from equipment at the bottom of the pressure vessel.

As the camera-equipped submersible robot advanced toward the bottom of the containment vessel, it captured how pipes and structures had collapsed in a heap.

Although the company thinks such lumps are highly likely to be nuclear fuel debris due to their shape, it has yet to determine exactly what they are. It is because TEPCO could neither measure radiation levels nor collect material in the probe for analysis.
The operator plans to analyze the collected footage in the days ahead to ascertain the extent of scattered debris.
If, or when, any further robot probe is conducted has yet to be decided.
“We have yet to plan a new survey so far,” a TEPCO official said.

TEPCO releases new footage of suspected melted fuel debris at Fukushima plant

https://mainichi.jp/english/articles/20170725/p2a/00m/0na/021000c

This still image from a video provided by the International Research Institute for Nuclear Decommissioning shows what appears to be a bolt covered with deposits believed to be melted nuclear fuel at the No. 3 reactor of the Fukushima No. 1 Nuclear Power Plant.
Tokyo Electric Power Co. on July 24 released a new video of a containment vessel at the No. 3 reactor of the ravaged Fukushima No. 1 Nuclear Power Plant.
The video was filmed by an underwater robot, which was sent into the reactor to study the condition of melted fuel debris. The four-minute long footage showed a large amount of lava-like lumps believed to be debris of melted fuel stuck to machines and building frameworks.

Melted fuel removal plan to be in place by September

Fuel debris removal plan due by around Sept.

https://www3.nhk.or.jp/nhkworld/en/news/20170725_16/

Japan's industry minister says the government hopes to have a policy in place by around September on how to remove melted fuel from the No.3 reactor of the disabled Fukushima Daiichi nuclear power plant.

Hiroshige Seko told reporters on Tuesday that a robotic probe has confirmed lumps that could be fuel debris in the No.3 reactor, giving researchers valuable information.

Seko said he hopes a policy on how to remove the debris can be formulated, based on an analysis and assessment of the probe's findings.

During the survey last week, a submersible robot found lumps below the reactor pressure vessel and at the bottom of the containment vessel.
It's the first time a probe has identified what could be a mixture of melted nuclear fuel and broken metal parts lodged inside a reactor container.

Removing the fuel debris would require the use of remote-controlled robots. It is considered the most challenging step in the process to decommission the reactor.

The industry minister suggested that the government plans to honor the existing timetable for decommissioning.

The plan calls for setting specific methods for removing fuel debris by the first half of 2018, so the actual work can begin by the end of 2021.

July 31, 2017

Removing debris without water

'Dry method' recommended for fuel debris removal

https://www3.nhk.or.jp/nhkworld/en/news/20170731_24/

A Japanese government body has recommended a method known as "dry removal" to retrieve nuclear fuel debris from the damaged Fukushima Daiichi power plant.

The Nuclear Damage Compensation and Decommissioning Facilitation Corporation said on Monday that the method should be the first option for all 3 reactors that suffered meltdowns.

Fuel inside the reactors is believed to have melted in the 2011 accident and combined with the reactor structures to form fuel debris. The fuel in each of the 3 reactors apparently melted through their surrounding pressure vessels, and collected at the bottom of the containment vessels.

The corporation initially considered another fuel-retrieval method involving filling the vessels with water to block high levels of radiation given off by the debris.

But it now says this method is too technically difficult and risks exposing workers to radiation and leaks of contaminated water.

The corporation instead proposes that a remote-controlled robot be deployed through a pipe in the side of the containment vessel to retrieve the debris at its bottom.

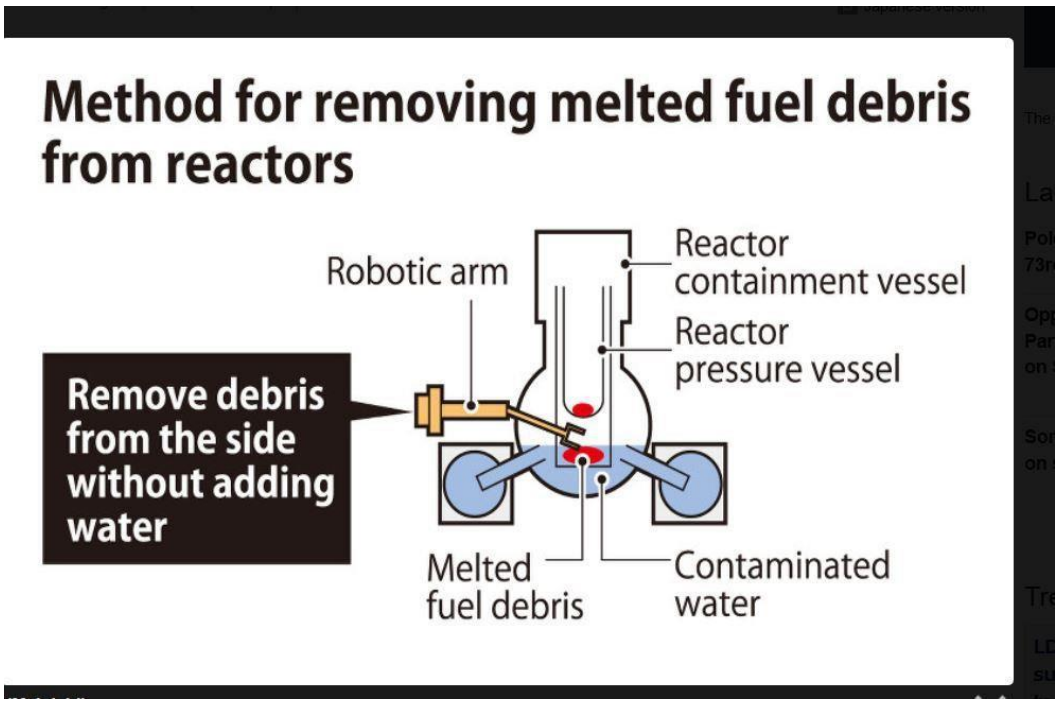
The nuclear power plant at Three Mile Island in the United States is the only place where fuel debris has been retrieved. It was done using the submersion method.

If the Japanese government and the plant's operator, Tokyo Electric Power Company, decide to go ahead with the new removal plan, it will be the first time the dry method is used.

They want to decide on a removal method for each reactor by September. But they have to find ways to block the radiation and keep radioactive substances from being released.

State minister for economy and industry Yosuke Takagi says it's meaningful that a removal method is recommended, and that the government will base its discussion on the corporation's proposal.

August 1, 2017



New proposal suggests removing Fukushima plant's melted nuclear fuel from side

A method to remove melted nuclear fuel debris on the bottom of the containment vessels of Fukushima No. 1 Nuclear Power Plant's first, second and third reactors from the side was proposed by the Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF) on July 31.

- 【Related】TEPCO releases new footage of suspected melted fuel debris at Fukushima plant
- 【Related】In Photos: Swimming robot probes Fukushima reactor to find melted fuel
- 【Related】Underwater robot finds likely melted fuel heap inside Fukushima reactor

Hajimu Yamana, head of the NDF, which is tasked with considering how to remove fuel debris from the reactors, for the first time explained the organization's specific method proposal to the heads of local governments at a countermeasures for the decommissioning and handling of the contaminated water council meeting held in Iwaki, Fukushima Prefecture.
The method would focus on prioritizing the removal of debris from the bottom of the vessels from the side, using robotic arms and other remote devices while flushing water over the debris. However, ways to block radiation and countermeasures against the scattering of airborne radioactive dust still remain unsolved. The central government and Tokyo Electric Power Co. (TEPCO) plan to finalize ther policy to remove the debris and amend the decommission schedule in September.
In all three of the reactors, contaminated water has collected at the bottom of the containment vessels. The NDF had previously considered a "flooding method" that would fill the containment vessels completely with water to block radiation from leaking. However, measures to repair the containment vessels and prevent leakage of the radioactive water would be difficult, so the plan was put aside for having "too many issues."

August 2, 2017

"Dry" method for fuel removal not so easy

NRA chief: Fuel debris removal method is not easy

https://www3.nhk.or.jp/nhkworld/en/news/20170802_28/

The chief of Japan's Nuclear Regulation Authority has said it is "far from easy" to retrieve nuclear fuel debris from the damaged Fukushima Daiichi power plant using the "dry removal" method. A government body has recommended using the process.

NRA Chairman Shunichi Tanaka spoke to reporters on Wednesday about the method proposed by the Nuclear Damage Compensation and Decommissioning Facilitation Corporation earlier this week. The government body is considering how to decommission 3 reactors of the Fukushima plant. They suffered meltdowns in the 2011 nuclear accident.

Removing nuclear fuel debris, which is believed to be at the bottom of containment vessels, is considered the biggest hurdle in decommissioning the reactors.

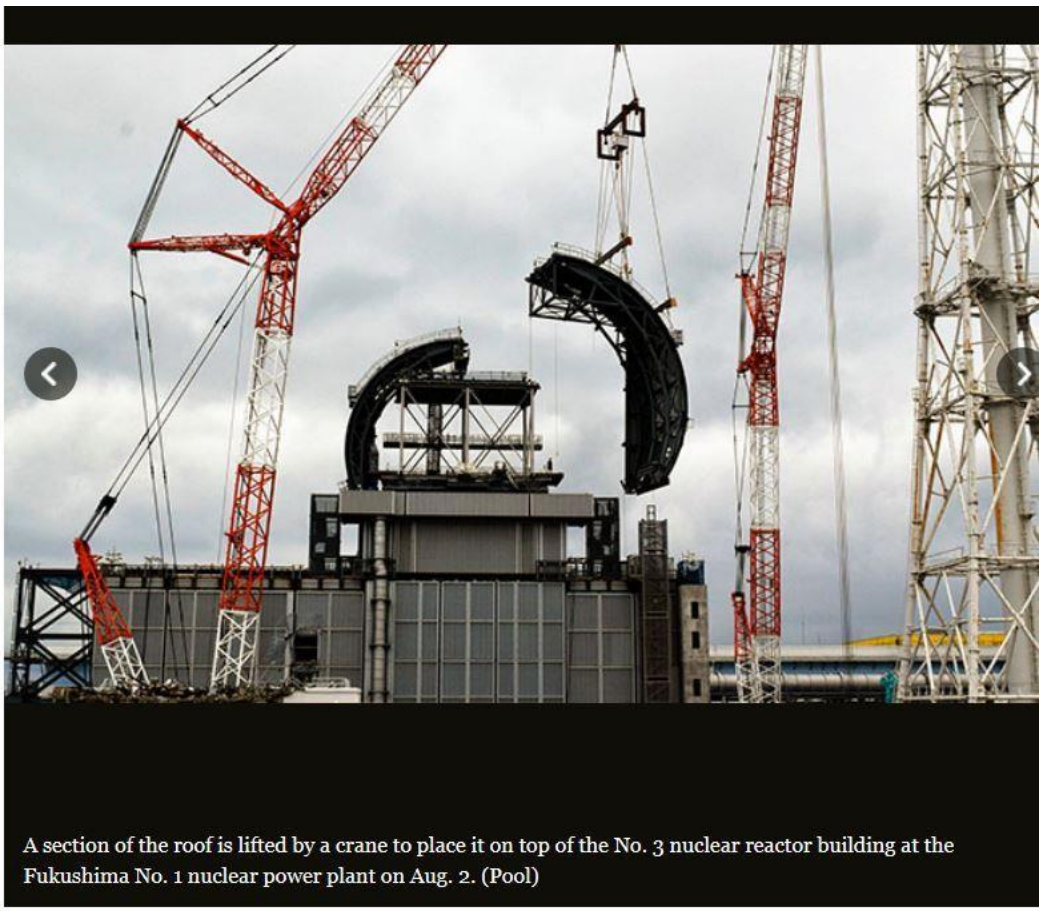
Officials of the corporation initially considered filling the containment vessels with water to block high levels of radiation given off by the debris. But on Monday they said the "dry removal" process should be predominantly considered. It does not fill the vessels to the upper levels with water.

Tanaka noted that it is common for nuclear fuel to be stored and transported underwater to block radiation.

He said it is very difficult to handle nuclear fuel that gives off a massive amount of radiation. Tanaka said simply retrieving the debris from the vessel will not end the difficulties. He added that once nuclear fuel is exposed to air no one can stay nearby.

Tanaka stressed that finding ways to block the extremely high levels of radiation is crucial.

A new roof for reactor No.1



A section of the roof is lifted by a crane to place it on top of the No. 3 nuclear reactor building at the Fukushima No. 1 nuclear power plant on Aug. 2. (Pool)

Hydrogen blast reactor's new roof in progress at Fukushima

http://www.asahi.com/ajw/articles/AJ201708020046.html

By CHIKAKO KAWAHARA/ Staff Writer
OKUMA, Fukushima Prefecture--Tokyo Electric Power Co. showed reporters its progress in installing a new roof above Fukushima No. 1 nuclear plant's No. 3 reactor building on Aug. 2, ahead of work to remove spent nuclear fuel from a storage pool.
The company demonstrated how it is carrying out the work, which is necessary because the upper section of the reactor building was blown off in a hydrogen explosion in the nuclear disaster at the plant in March 2011.
The roof project marks a step toward removing nuclear fuel assemblies in the spent nuclear fuel storage pool in the building.
To prevent the spread of radioactive material, TEPCO started to set up the half-tubular shaped cover to shield the damaged reactor building at the end of last month.
The 566 nuclear fuel assemblies currently lying in the pool will become a significant risk if another major disaster strikes the area.
TEPCO is expected to start removing the fuel from around mid-fiscal 2018.
Early on Aug. 2, part of the roof measuring around 17 meters high and weighing 37 tons was lifted to the top floor of the reactor building with a large crane.

Workers connected the new part of the cover to another section that had been installed at the end of July, completing one eighth of the roof. When finished, it will be about 60 meters long.
Dedicated removal machines are needed to retrieve the fuel from the storage pool. The machines that had been used at the plant prior to the accident were removed because they were severely damaged by the hydrogen explosion.

Fuel removal prep begins at Fukushima Daiichi

https://www3.nhk.or.jp/nhkworld/en/news/20170802_17/

Workers at the crippled Fukushima Daiichi nuclear power plant are preparing to remove nuclear fuel from one of the damaged reactor buildings.

They began to put part of a dorm-shaped cover over the No.3 reactor building on Wednesday morning. This work is to prevent radioactive materials from spreading and shelter the area from winds.

The completed cover would measure 17 meters high and 11 meters wide and weigh 37 tons.

A total of 566 spent and unused fuel units remain in the fuel cooling pool.

Tokyo Electric Power Company plans to remove the fuel in the next fiscal year starting in April, 2018, as part of decommissioning the plant.

A Kajima Corporation official in charge of the installation said they may put a lid on the pool to ensure nothing falls into it.

392 fuel units remain in the No.1 reactor pool and 615 units in the No.2 reactor pool.

August 11, 2017

Decommissing: Still a long way to go (video)

Fukushima nuke plant decommissioning still has long way to go

https://mainichi.jp/english/articles/20170811/p2a/00m/0na/025000c

Mainichi Shimbun reporters visited the Fukushima No. 1 Nuclear Power Plant on July 27. While the working environment at the station has improved, plant operator Tokyo Electric Power Co. (TEPCO) still has a mountain of problems to tackle, such as removing melted nuclear fuel from the No. 1 to No. 3 reactors and treating contaminated water.

August 15, 2017

NRA allows construction of icewall

Completion of Fukushima plant ice wall approved

https://www3.nhk.or.jp/nhkworld/en/news/20170815_24/

Nuclear regulators have approved the completion of an ice wall being built to keep groundwater from entering the damaged Fukushima Daiichi reactor buildings.

The Nuclear Regulation Authority on Tuesday gave permission to complete the remaining part of the underground ice wall. Freezing of the soil started in March last year.

Plant operator Tokyo Electric Power Company is circulating coolant in pipes buried around the buildings to make the 1.5 kilometer-long ice barrier.

The utility hopes to keep groundwater from entering the buildings and being contaminated with radioactive substances.

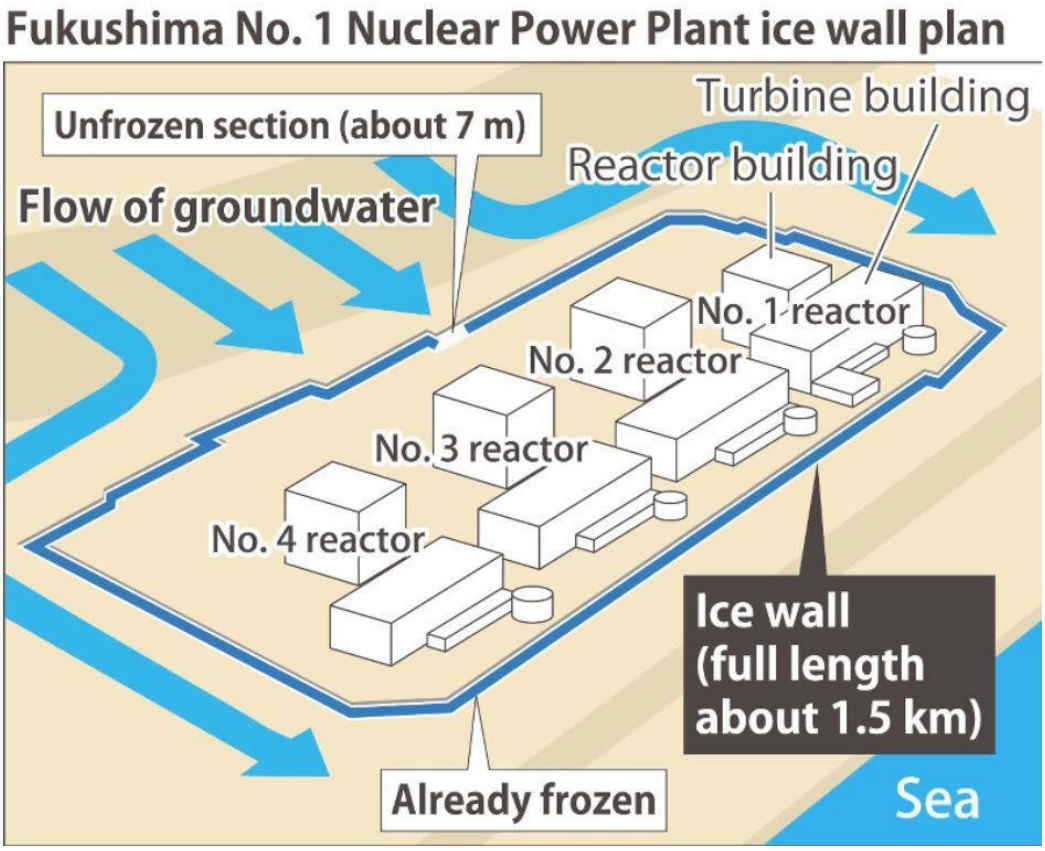
TEPCO officials had left a 7-meter section of the wall unfrozen. Nuclear regulators were concerned that freezing the entire wall could lead to a sharp drop in the level of groundwater outside the buildings. They said this might cause tainted water inside to leak out.

The utility explained to regulators they don't expect the groundwater level to plunge, and they are prepared to deal with such a case.

TEPCO officials plan to start freezing the remaining section on Tuesday next week. They say the completed ice wall will help to drastically reduce the amount of contaminated water.

August 16, 2017

Icewall : "I can't say how effective"



High-priced Fukushima ice wall nears completion, but effectiveness doubtful

https://mainichi.jp/english/articles/20170816/p2a/00m/0na/016000c

A subterranean ice wall surrounding the nuclear reactors at the stricken Fukushima No. 1 Nuclear Power Plant to block groundwater from flowing in and out of the plant buildings has approached completion.

- 【Related】Concern as leaky 'ice wall' around Fukushima nuke plant resembles 'bamboo screen

Initially, the ice wall was lauded as a trump card in controlling radioactively contaminated water at the plant in Fukushima Prefecture, which was crippled by meltdowns in the wake of the March 2011 Great East Japan Earthquake and tsunami. But while 34.5 billion yen from government coffers has already been invested in the wall, doubts remain about its effectiveness. Meanwhile, the issue of water contamination looms over decommissioning work.

In a news conference at the end of July, Naohiro Masuda, president and chief decommissioning officer of Fukushima Daiichi Decontamination & Decommissioning Engineering Co., stated, "We feel that the ice wall is becoming quite effective." However, he had no articulate answer when pressed for concrete details, stating, "I can't say how effective."

The ice wall is created by circulating a coolant with a temperature of minus 30 degrees Celsius through 1,568 pipes that extend to a depth of 30 meters below the surface around the plant's reactors. The soil around the pipes freezes to form a wall, which is supposed to stop groundwater from flowing into the reactor buildings where it becomes contaminated. A total of 260,000 people have worked on creating the wall. The plant's operator, Tokyo Electric Power Co. (TEPCO) began freezing soil in March last year, and as of Aug. 15, at least 99 percent of the wall had been completed, leaving just a 7-meter section to be frozen.

Soon after the outbreak of the nuclear disaster, about 400 tons of contaminated water was being produced each day. That figure has now dropped to roughly 130 tons. This is largely due to the introduction of a subdrain system in which water is drawn from about 40 wells around the reactor buildings. As for the ice wall, TEPCO has not provided any concrete information on its effectiveness. An official of the Secretariat of the Nuclear Regulation Authority (NRA) commented, "The subdrain performs the primary role, and the ice wall will probably be effective enough to supplement that." This indicates that officials have largely backtracked from their designation of the ice wall as an effective means of battling contaminated water, and suggests there is unlikely to be a dramatic decrease in the amount of decontaminated groundwater once the ice wall is fully operational.

TEPCO ordered construction of the ice wall in May 2013 as one of several plans proposed by major construction firms that was selected by the government's Committee on Countermeasures for Contaminated Water Treatment. In autumn of that year Tokyo was bidding to host the 2020 Olympic and Paralympic Games, and the government sought to come to the fore and underscore its measures to deal with contaminated water on the global stage.

Using taxpayers' money to cover an incident at a private company raised the possibility of a public backlash. But one official connected with the Committee on Countermeasures for Contaminated Water Treatment commented, "It was accepted that public funds could be spent if those funds were for the ice wall, which was a challenging project that had not been undertaken before." Small-scale ice walls had been created in the past, but the scale of this one -- extending 1.5 kilometers and taking years to complete -- was unprecedented.

At first, the government and TEPCO explained that an ice wall could be created more quickly than a wall of clay and other barriers, and that if anything went wrong, the wall could be melted, returning the soil to its original state. However, fears emerged that if the level of groundwater around the reactor buildings drops as a result of the ice wall blocking the groundwater, then tainted water inside the reactor buildings could end up at a higher level, causing it to leak outside the building. Officials decided to freeze the soil in stages to measure the effects and effectiveness of the ice wall. As a result, full-scale operation of the wall -- originally slated for fiscal 2015 -- has been significantly delayed.

Furthermore, during screening by the NRA, which had approved the project, experts raised doubts about how effective the ice wall would be in blocking groundwater. The ironic reason for approving its full-scale operation, in the words of NRA acting head Toyoshi Fuketa, was that, "It has not been effective in blocking water, so we can go ahead with freezing with peace of mind" -- without worrying that the level of groundwater surrounding the reactor buildings will decrease, causing the contaminated water inside to flow out.

Maintaining the ice wall will cost over a billion yen a year, and the radiation exposure of workers involved in its maintenance is high. Meanwhile, there are no immediate prospects of being able to repair the basement damage in the reactor buildings at the crippled nuclear plant.

Nagoya University professor emeritus Akira Asaoka commented, "The way things stand, we'll have to keep maintaining an ice wall that isn't very effective. We should consider a different type of wall."

In the meantime, TEPCO continues to be plagued over what to do with treated water at the plant. Tainted water is treated using TEPCO's multi-nuclide removal equipment to remove 62 types of radioactive substances, but in principle, tritium cannot be removed during this process. Tritium is produced in nature through cosmic rays, and nuclear facilities around the world release it into the sea. The NRA takes the view that there is no problem with releasing treated water into the sea, but there is strong resistance to such a move, mainly from local fishing workers who are concerned about consumer fears that could damage their businesses. TEPCO has built tanks on the grounds of the Fukushima No. 1 plant to hold treated water, and the amount they hold is approaching 800,000 metric tons.

In mid-July, TEPCO Chairman Takashi Kawamura said in an interview with several news organizations that a decision to release the treated water into the sea had "already been made." A Kyodo News report on his comment stirred a backlash from members of the fishing industry. TEPCO responded with an explanation that the chairman was not stating a course of action, but was merely agreeing with

the view of the NRA that there were no problems scientifically with releasing the treated water. However, the anger from his comment has not subsided.
Critical opinions emerged in a subsequent meeting that the Ministry of Economy, Trade and Industry held in the Fukushima Prefecture city of Iwaki at the end of July regarding the decontamination of reactors and the handling of contaminated water. It was pointed out that prefectural residents had united to combat consumer fears and that they wanted officials to act with care. One participant asked whether the TEPCO chairman really knew about Fukushima.
The ministry has been considering ways to handle the treated water, setting up a committee in November last year that includes experts on risk evaluation and sociology. As of Aug. 15, five meetings had been held, but officials have yet to converge on a single opinion. "It's not that easy for us to say, 'Please let us release it.' It will probably take some time to reach a conclusion," a government official commented.
See also http://www.asahi.com/ajw/articles/AJ201708160032.html

August 21, 2017

Icewall: Final phase

Work to finish ice wall at crippled plant to begin

https://www3.nhk.or.jp/nhkworld/en/news/20170821_13/

The operator of the crippled Fukushima Daiichi nuclear plant will begin the final phase of creating an underground ice wall on Tuesday.

Tokyo Electric Power Company started the work 17 months ago, with the aim of preventing groundwater from entering reactor buildings and getting contaminated with radioactive substances.

The 1.5-kilometer ice barrier is deemed a key step to curb the buildup of tainted water at the plant.

The soil is frozen by sending liquid at minus 30 degrees Celsius into pipes buried around the buildings. But the utility has left a 7-meter section unfrozen, fearing the sudden fall in groundwater levels around the buildings.

There were concerns that the difference of water levels in and outside the reactor buildings would cause tainted water inside to leak out.

But last Tuesday, the Nuclear Regulation Authority said safety measures are ready and gave its approval to freeze of the final section.

Officials of the utility say they will carefully monitor the freezing process of the remaining section.

They say it may take longer to fully freeze than other areas, because the flow of groundwater has been concentrated in that section.

The officials expect that the wall, when completed, will reduce the inflow of groundwater to the buildings from 140 tons a day to less than 100 tons.

August 22, 2017

Fukushima ice wall's last section being frozen

https://www3.nhk.or.jp/nhkworld/en/news/20170822_19/

Final procedures have begun to complete an ice wall to prevent groundwater from entering the contaminated Fukushima Daiichi nuclear power plant.

Tokyo Electric Power Company workers started the process to freeze the remaining 7-meter section of the ice wall on Tuesday.

They opened 11 valves to allow coolant at a temperature of minus 30 degrees Celsius to circulate in the underground pipes.

TEPCO began freezing the 1.5 kilometer long wall in March of last year. The last section on the mountain side of the facility had been left unfrozen as officials said the move could cause a sudden drop in groundwater levels around the reactor buildings.

But the Nuclear Regulation Authority said safety measures were in place and gave permission for the procedure earlier this month.

TEPCO says it could take longer than the 2 months projected based on past records for the section to freeze, because the groundwater is flowing at a rapid rate.

They say once the wall is completed, the volume of groundwater flowing into the reactor buildings will be reduced to less than 100 tons a day, from the current 140 tons.

The nuclear regulators say they will carefully monitor the effectiveness of the wall.

TEPCO begins extending ice wall to reduce tainted water in Fukushima

https://mainichi.jp/english/articles/20170822/p2g/00m/0dm/053000c

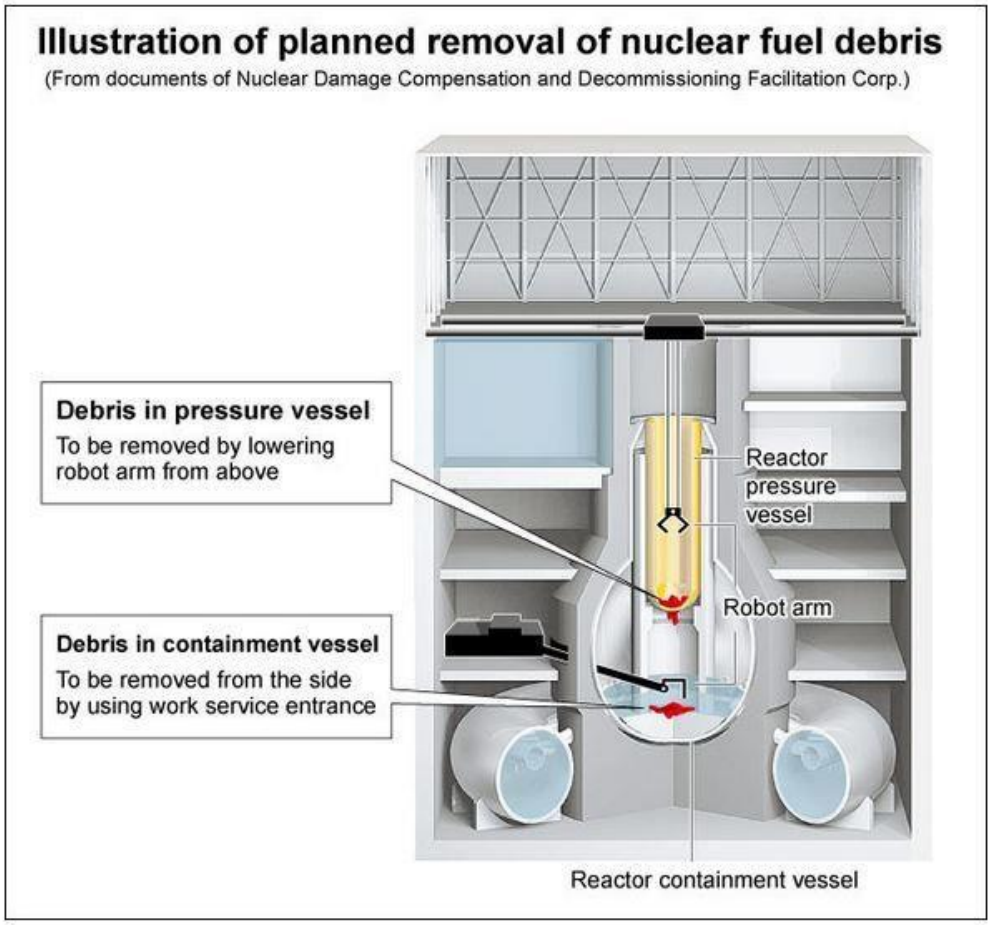
FUKUSHIMA, Japan (Kyodo) -- The operator of the crippled Fukushima Daiichi nuclear complex began work Tuesday to extend an underground ice wall to prevent contaminated water increasing within the facilities.
The coolant-filled wall is designed to prevent groundwater from seeping into the facilities and touching melted nuclear fuel or becoming mixed with highly contaminated water inside reactor buildings.
The government has spent some 35 billion yen ($320 million) on the project. Work by Tokyo Electric Power Company Holdings Inc. to freeze the wall began in March last year.
On Tuesday, the utility opened valves to circulate coolant for the remaining section of the 1.5-kilometer-long, 30-meter-deep wall around the four reactor buildings.
TEPCO is expected to complete the wall possibly this fall by cooling the remaining portion on the west side of the buildings, a section stretching for about 7 meters.
About 400 tons of water was initially flowing inside the buildings per day but the amount has fallen to 120 to 130 tons this year, according to TEPCO. The utility aims to slash the daily inflow of groundwater to less than 100 tons with the full operation of the ice wall.

Pipes have been inserted into the ground to circulate coolant and freeze the nearby soil. Since starting the freezing work in March last year, the operator has gradually expanded the ice wall as freezing the entire wall at once could change the groundwater level, possibly causing highly radioactive water in the basements of the buildings to leak outside.
"We want to carefully freeze (the wall) by monitoring water levels both inside and outside the reactor buildings," a TEPCO official told a press conference in the city of Fukushima.

See also: https://www.japantimes.co.jp/news/2017/08/22/national/tepco-begins-extending-ice-wall-reduce-tainted-water-fukushima-plant/

August 31, 2017

Dry removal recommended by decommissioning commission



Group: Water plan to remove Fukushima fuel 'not viable'

http://www.asahi.com/ajw/articles/AJ201708310042.html

By KOHEI TOMIDA/ Staff Writer

A decommissioning organization on Aug. 31 formally recommended bypassing a safety measure to remove melted nuclear fuel from crippled reactors at the Fukushima No. 1 nuclear plant.
The Nuclear Damage Compensation and Decommissioning Facilitation Corp. (NDF) urged the central government and Tokyo Electric Power Co. to use the “airborne method” in which the melted fuel is removed even when the water level in the reactor containment vessel is kept low.
Proposals have been made to fill the containment vessels with water to restrain the spewing of radioactive materials during the fuel removal process.
But the NDF said that method is currently not viable because of the difficulties in patching up the holes in the containment vessels.
The government and TEPCO are expected to decide on a fuel removal method in September and confirm the specific steps next fiscal year.
The removal of equipment and other structural objects in and around the reactors must be completed before work can start on taking out melted fuel that remains in the pressure vessels.
The nuclear fuel that has seeped through the pressure vessels and landed at the bottom of the containment vessels will be the first to be removed.
Work will also have to be done to develop a robot arm that can remove fuel from the side of the containment vessel.
Under the current schedule, removal of the melted fuel will start at one of the three, No. 1 to No. 3, reactors of the Fukushima No. 1 plant in 2021.
However, officials still do not know the exact location of the melted fuel in the reactors.
Hajimu Yamana, NDF president, pointed out there would likely be a need to combine various methods instead of pushing through with one specific procedure to meet the scheduled deadline.

Dry method' recommended to remove nuclear debris

https://www3.nhk.or.jp/nhkworld/en/news/20170831_18/

A Japanese government body has officially recommended a method known as "dry removal" to retrieve nuclear fuel debris from the damaged Fukushima Daiichi power plant.

The Nuclear Damage Compensation and Decommissioning Facilitation Corporation submitted the recommendation to the government on Thursday. It said the method should be the first option for all 3 reactors that suffered meltdowns.

Fuel in each of the 3 reactors is believed to have melted in the 2011 accident and combined with the reactor structures to form fuel debris. Most of the fuel is considered to have melted through surrounding pressure vessels and accumulated at the bottom of the containment vessels.

Removing the debris is considered the biggest hurdle to decommission the reactors as it gives off high levels of radiation.

The Corporation initially considered another method that involved filling the vessels with water to block high levels of radiation. But the body says it is difficult to repair the containment vessels damaged by the accident.

The body says that nuclear debris at the bottom of the containment vessels should be retrieved from the side of the vessels, but debris left at the bottom of the reactors' pressure vessels should be taken out from the top. It also says combinations of other methods should be considered in the future.

Hajimu Yamana, head of the Corporation, said it plans to begin the work to retrieve nuclear fuel debris

in 2021, and that there has been no reason for changing the schedule so far.

The Japanese government and Tokyo Electric Power Company will review the schedule for decommissioning the reactors based on the body's recommendation. They will announce in September which method they will choose to remove debris from each of the 3 reactors.

September 10, 2017

Using drones for safety to measure radiation inside

Drone to measure radiation inside tainted Fukushima plant buildings

https://mainichi.jp/english/articles/20170910/p2g/00m/0dm/008000c#cxrecs_s

TOKYO (Kyodo) -- The operator of the crippled Fukushima Daiichi nuclear power plant is planning to use a drone to measure radiation inside heavily contaminated structures as it prepares to decommission damaged reactors there, according to officials of the operator.
Data obtained from its use is expected to help the operator, Tokyo Electric Power Company Holdings Inc., create 3-D maps and identify areas with high-level radiation inside buildings where workers cannot stay safely.
The drone envisioned for the task is 93 centimeters wide and 83 cm long, and, equipped with four propellers, can fly for around 15 minutes. The operator envisions its use inside buildings that house damaged reactors and inside those housing turbines.
In February Tepco, as it is known, tested a drone inside the turbine building for the No. 3 reactor, one of three reactors that experienced meltdowns in the March 2011 earthquake and tsunami.
After improving its performance, the plant operator has decided to put the drone into use for radiation measurement. But it is still considering where it should begin using the machine, according to the officials.
The government and Tepco are aiming to start debris extraction work from 2021, and are currently in the process of determining a specific approach to removing melted fuel from each damaged reactor and of updating their decommissioning road map.

September 20, 2017

Retrieval of spent fuel at 1 & 2 reactors delayed three years

Spent fuel retrieval at Fukushima to be delayed

https://www3.nhk.or.jp/nhkworld/en/news/20170920_04/

Japan's government and Tokyo Electric Power Company plan to delay the retrieval of spent nuclear fuel from the reactor buildings at the Fukushima Daiichi plant.

The government is revising the roadmap for scrapping the plant for the first time in 2 years. The reactors were disabled in the 2011 earthquake and tsunami.

Officials plan to postpone the retrieval of spent fuel rods from the storage pools at the Number 1 and

Number 2 reactors until fiscal 2023. That's 3 years later than the current schedule.

They cite the need for more time to remove rubble and radioactive substances from the site.

The retrieval of spent fuel from the Number 3 reactor is due to start as planned in the fiscal year that begins next April.

The government will reflect the opinions of local authorities in the revision. It aims to finalize the new roadmap later this month.

Nuclear Watch: Nuclear Fuel Retrieval Delayed

https://www3.nhk.or.jp/nhkworld/nhknewsline/nuclearwatch/nuclearfuelretrievaldelayed/

September 21, 2017

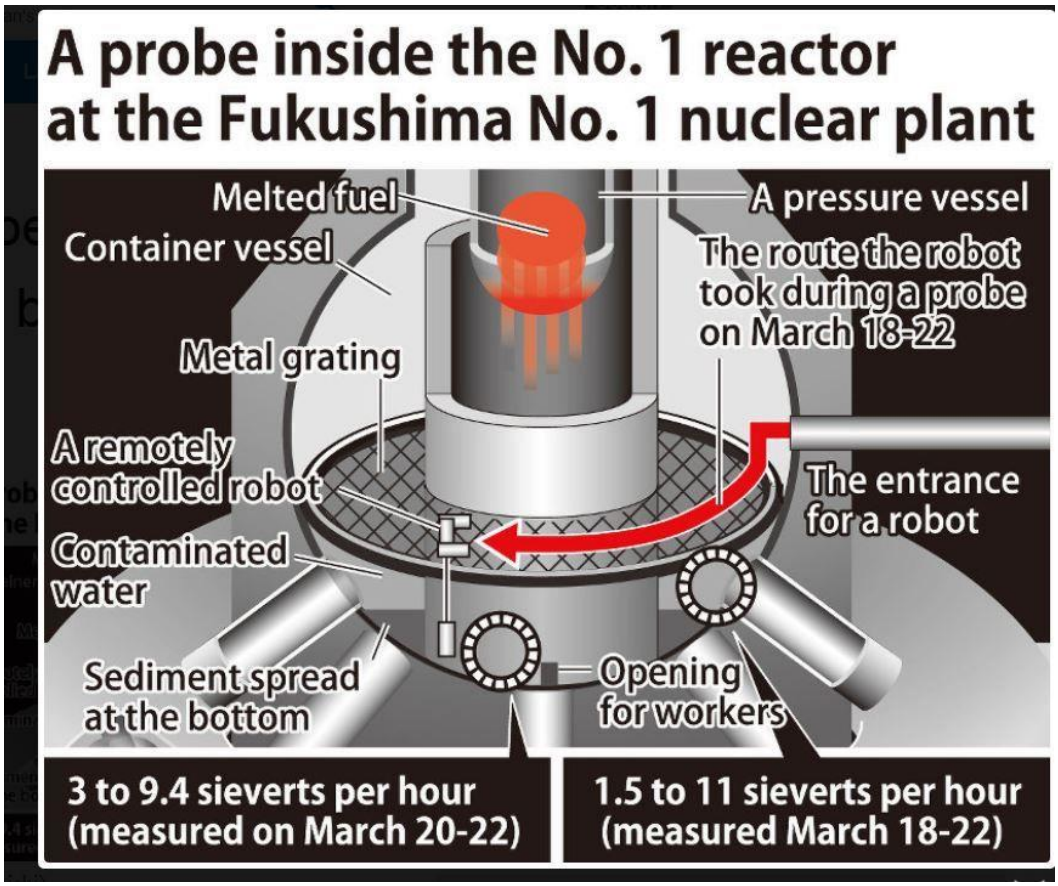
TEPCO to delay emptying fuel storage pools at Fukushima plant

http://www.asahi.com/ajw/articles/AJ201709210034.html

By CHIKAKO KAWAHARA/ Staff Writer
Plans to remove fuel rods from two spent fuel pools at the Fukushima No. 1 nuclear plant will be delayed by up to three years because of difficulties in clearing debris and reducing radiation levels.
The government and plant operator Tokyo Electric Power Co. originally expected to start emptying the storage pools at the No. 1 and No. 2 reactor buildings in fiscal 2020.
But they plan to move the starting time to fiscal 2023 in their first review in two years of the roadmap for decommissioning the stricken nuclear plant, sources said Sept. 20.
They are expected to announce the revised roadmap later this month.
A survey of the upper levels of the two reactor buildings, where the storage pools are located, found debris piled up in a much more complicated way than initially envisaged.
That will lengthen the time needed to clear the debris, thus delaying the removal of the fuel rods, the sources said.
In addition, radiation levels remain extremely high inside the buildings.
The No. 1 reactor's storage pool holds 392 nuclear fuel assemblies, while the No. 2 reactor's pool has 615 assemblies.
Work to remove the 566 assemblies from the No. 3 reactor's pool is scheduled to begin in the middle of fiscal 2018 as originally planned.
The three reactors melted down in the 2011 disaster, triggered by the magnitude-9.0 Great East Japan Earthquake and tsunami.
The review of the decommissioning roadmap is also expected to revise the target of "starting the removal" of melted nuclear fuel and debris in the three reactors in 2021 to "aiming to start the removal" in 2021.
But the government and TEPCO will maintain the goal of completing the decommissioning in "30 to 40 years," the sources said.

September 26, 2017

Fuel removal delayed again (2)



Spent nuclear fuel removal at Fukushima plant to be delayed again

https://mainichi.jp/english/articles/20170926/p2g/00m/0dm/064000c#cxrecs_s

TOKYO (Kyodo) -- The government and Tokyo Electric Power Company Holdings Inc. decided Tuesday to delay again the start of removing spent nuclear fuel left near two of the three reactors which suffered a meltdown at the Fukushima complex.

- 【Related】New proposal suggests removing Fukushima plant's melted nuclear fuel from side
- 【Video】TEPCO releases new footage of suspected melted fuel debris at Fukushima plant
- 【Related】News Navigator: Why are costs for dealing with Fukushima disaster growing?

In the road map for decommissioning the Fukushima Daiichi plant, revised for the fourth time since it was first crafted in December 2011, highly radioactive spent nuclear fuel will be extracted from the Nos. 1 and 2 units' cooling pools starting in fiscal 2023 instead of fiscal 2020.
It is the third time that the schedule for spent fuel removal has been pushed back at the Nos. 1 and 2 reactors, with the previous postponement taking place in June 2015. The government said new technical issues and the need to take safety precautions led to the latest schedule change.
The cleanup process is to be completed in around 30 to 40 years.

For the No. 3 reactor at the Fukushima plant, the schedule to remove spent nuclear fuel during fiscal 2018 is unchanged after having already been pushed back earlier this year.
In the decommissioning process, taking out fuel rod assemblies from the spent fuel pools inside reactor buildings is one of the key steps before extracting melted fuel debris from the Nos. 1 to 3 reactors, all of which suffered core meltdowns following the March 2011 earthquake and tsunami disaster.
The schedule for extraction of the melted fuel debris at the reactors was also revised, with the determination of a specific approach to remove the debris to be made in fiscal 2019, rather than in the originally planned first half of fiscal 2018.
Despite the delay in finalizing specific methods, the road map kept the start of the debris extraction, the most challenging part of the decommissioning process, at 2021.
A method currently considered feasible by the government is debris removal from the side of the three crippled reactors by partially filling them with water.
The road map newly sets the goal of cutting the amount of underground water at the plant to address contaminated water buildup at the site. Underground water, which gets mixed with accumulated radioactive water generated in the process of cooling the damaged reactors -- is to be cut to around 150 tons per day in 2020 from the current 200 tons.
It did not mention a specific schedule for disposal of processed water that still contains radioactive tritium.
The road map was first crafted in December 2011 in the wake of the 2011 disaster which triggered at the Fukushima plant the world's worst nuclear crisis since the 1986 Chernobyl disaster.
Attempts have been made to confirm internal conditions of the damaged reactors using robots. A survey robot captured images of what is likely to be melted nuclear fuel at the bottom of the No. 3 reactor for the first time in July this year.

Nos 1& 2 reactors: Plans for decommissioning revised

3-year delay in removal of fuel rods from Fukushima plant

http://www.asahi.com/ajw/articles/AJ201709260025.html

By CHIKAKO KAWAHARA/ Staff Writer
The government on Sept. 26 revised its long-term plan to decommission the crippled Fukushima No. 1 nuclear power plant, citing high levels of radiation.
It said the three-year delay concerns the removal of spent fuel rods kept in storage pools at the No. 1 and 2 reactor buildings and will not affect the overall plan to fully dismantle the facility within 30 to 40 years.
A committee of Cabinet ministers involved in the process met Sept. 26 and approved the changes submitted by the government and Tokyo Electric Power Co., operator of the Fukushima plant.
The decommissioning road map was last revised in June 2015.
The spent fuel storage pool in the No. 1 reactor building holds 392 fuel assemblies, while the pools in the No. 2 and No. 3 pools contain 615 and 566 assemblies, respectively.
The upper part of the No. 1 reactor building was destroyed in a hydrogen explosion, spreading rubble and debris throughout the building. Studies earlier this year showed that radiation levels within the building are still high.
The No. 2 reactor building was not damaged, but decontamination work within the building is expected to take longer than initially expected.
For those reasons, the start of removal of the fuel rods from the No. 1 and 2 reactor storage pools will be put off until fiscal 2023.

The start of removal of fuel rods from the No. 3 reactor storage pool remains unchanged from fiscal 2018.
It was decided in February 2017 to delay the start of work from fiscal 2017 by one year. Work to remove melted nuclear fuel from the three reactors' containment vessels will also be delayed.
Remote-controlled robots have been used since the start of the year to study the interior of the vessels, but the state of the melted fuel has only partially been determined.
Further studies will be carried out to assess the dangers.
There is no change as yet in the plan to begin removing melted fuel from one of the three reactors before the end of 2021.
But a decision on which reactor to work on first will be delayed until fiscal 2019. At that time, the specifics of how to accomplish the removal work will also be decided. It was initially envisaged that these two points would be thought through in the first half of fiscal 2018.

September 27, 2017

Melted fuel but also contaminated water and radioactive waste still to be faced

A Tokyo Electric Power Co. official wearing radiation protection gear stands in front of Advanced Liquid Processing Systems during a press tour at the Fukushima No. 1 nuclear power plant in 2014. (AP file photo)

Melted fuel, other challenges left in Fukushima nuclear cleanup

http://www.asahi.com/ajw/articles/AJ201709270019.html

THE ASSOCIATED PRESS
Japan's government approved a revised road map Tuesday to clean up the radioactive mess left at the Fukushima No. 1 nuclear power plant after it was damaged beyond repair by an earthquake and tsunami in 2011. Decommissioning the damaged reactors is an uncertain process that is expected to take 30 to 40 years.
A look at some of the challenges:
THE FUEL RODS

The three reactors that had meltdowns together have 1,573 units of mostly used nuclear fuel rods that are still inside and must be kept cool in pools of water. They are considered among the highest risks in the event of another major earthquake that could trigger fuel rods to melt and release massive radiation due to loss of water from sloshing or structural damage because the pools are uncovered.
The plant operator, Tokyo Electric Power Co., or TEPCO, plans to begin moving the rods from reactor Unit 3 in the fiscal year beginning April 1.
However, the latest road map delays removal of the rods from units 1 and 2 for three years until fiscal 2023, because further decontamination work and additional safety measures are needed. Ironically, because the building housing reactor 3 was more heavily damaged, it is easier to remove that unit's fuel rods. The fuel rods will be moved to a storage pool outside the reactors, and eventually sent for long-term storage in what are known as dry casks.

THE MELTED FUEL

By far the hardest part of decommissioning Fukushima will be removing the fuel that melted and presumably spilled out of the reactor cores. In July, an underwater robot for the first time captured images inside the primary containment chamber of Unit 3. They showed a large number of solidified lava-like rocks and lumps on the chamber's floor, believed to be melted fuel mixed with melted and mangled equipment and parts of the structure.
The search for melted fuel in units 1 and 2 has so far been unsuccessful. The water level is lower, so crawling robots have been tried, but they have been obstructed by debris as well as extremely high radiation levels. Despite the unknowns about the melted fuel and debris and their whereabouts, the road map calls for finalizing the removal method in 2019, and starting actual removal at one of the reactors in 2021. The government-funded International Research Institute for Nuclear Decommissioning is developing robots and other technology to carry out the work.

CONTAMINATED WATER

TEPCO has treated and stored a massive amount of radioactive water--about 800,000 tons--and the volume is growing every day. Cooling water leaks out of the damaged reactors and mixes with groundwater that seeps into the basements of the reactor building, increasing the amount of contaminated water. The utility has managed to halve the volume to 200 tons per day by pumping up groundwater via dozens of wells dug upstream from the reactors, as well as installing a costly "ice wall" by freezing the ground to block some of the water from coming in and going out.
The water is stored in hundreds of tanks that cover much of the plant property. They get in the way of decommissioning work and pose another risk if they were to spill out their contents in another major earthquake or tsunami. After treatment, the water still contains radioactive tritium, which cannot be removed but is not considered harmful in small amounts. Experts say controlled release of the water into the ocean is the only realistic option, but TEPCO has not moved forward with that plan because of opposition from fishermen and residents who fear a negative image and possible health impact.

RADIOACTIVE WASTE

Japan has yet to develop a plan to dispose of the highly radioactive waste that will come out of the Fukushima reactors. Under the road map, the government and TEPCO will compile a basic plan during fiscal 2018. Managing the waste will require new technologies to compact it and reduce its toxicity.
Finding a storage site for the waste seems virtually impossible, as the government has not been able to find a site even for the normal radioactive waste from its nuclear power plants. The prospect raises doubts about whether the cleanup can really be completed within 40 years.

September 28, 2017

Delays and challenges galore

Fukushima's decommissioning delays, challenges and unknowns remain roadblocks to cleanup

http://www.beyondnuclear.org/japan/2017/9/28/fukushimas-decommissioning-delays-challenges-and-unknowns-re.html

Six and a half years after the Fukushima Daiichi triple meltdown, Japan's government, the nuclear regulator and Tokyo Electric Power Company's (TEPCO) most rudimentary plan of attack for recovery from radioactive catastrophe is delayed again. The first steps of decommissioning cannot legitimately begin until undamaged but highly radioactive "spent" fuel assemblies are removed from vulnerable reactor storage ponds, sufficiently cooled and re-contained in qualified dry storage casks. Then, there are the three melted fuel cores that still must be located, retrieved and somehow re-contained. Where all of the massive radioactive contamination will go is a mystery. In fact, there are an alarming number of challenges, continuing delays and unknowns that remain before securing the destroyed nuclear power station site and halting the ongoing release of radioactivity to the land, water and air.

Among the most immediate concerns is the management of 1007 highly radioactive and thermally hot irradiated nuclear fuel assemblies still in the two cooling pools perched atop the destroyed Units 1 and 2 outside of any containment structure. Each of the site's six-units has an elevated nuclear waste storage pond. The site has a large common pool located near Unit 4. The government recently admitted that previously unknown, possibly undisclosed, damage in these irradiated fuel storage ponds and radioactive contamination has again delayed the plan to move the dangerous fuel assemblies by at least another three years, now 2023. Unit 3 remains on schedule in 2018 to begin the two-year transfer of 514 irradiated fuel assemblies from its rooftop storage pool to a jam-packed common onsite pool located at ground level. This common pool and its massive radioactive inventory requires reliable cooling power. Unit 4 completed a three-year project to transfer its irradiated fuel into the common pool in 2014. The common pool now has 6,726 irrradiated fuel assemblies with a maximum design capacity of 6,840. As this common pool is already densely packed, it is ever more critical that Japan expedite the transfer of the sufficiently cooled irradiated nuclear fuel into qualified, individualized dry storage casks that can passively cool the hot nuclear waste without the need for water and electrical power. Currently, only 1,412 irradiated assemblies have been secured in onsite dry cask storage. These dry casks further need to be hardened against another natural disaster and possible terrorism.

The recurring delays at securing the irradiated fuel currently in wet pool storage (individual units to the common pool) and then into scientifically-qualified and hardened dry cask storage systems raises concern for public health, safety and the environment given the prospect of another large nearby earthquake causing a loss of cooling with the risk of a nuclear waste fire and radioactive releases. A 6.9 magnitude offshore earthquake on November 21, 2016 caused a temporary loss of cooling to wet storage systems at Fukushima Daiichi. Significant earthquakes of 6.0 to 6.9 magnitude occur in Japan on average 17 times per year, roughly one-tenth of all large earthquakes in the world. More severe earthquakes must be anticipated. The loss of cooling power and water to some or all of the more than 11,577 hot nuclear waste assemblies onsite outside of containment remains a significant public health, safety and environmental concern.

Japan is still technologically conceptualizing the "most challenging part" of Fukushima Daiichi's decommissioning and the recovery of three missing melted reactor cores if and when they can be located. The unprecedented operation has now been delayed until 2019. A viable technology for scooping up melted nuclear fuel does not yet exist. Re-containment and removal of the melted fuel

cores is key to addressing the ongoing massive buildup of radioactive water now estimated at 800,000 tons that is being stored in growing onsite tank farms. Groundwater flowing down into the reactor wreckage must be constantly pumped out, partially filtered of radioactivity and stored onsite in the large tanks. The tank farms themselves represent an additional environmental threat in the event of another severe earthquake that could rupture the structures with a radioactive flood into the ocean.

October 17, 2017

KEPCO wants to decommission 2 reactors at Oi plant

KEPCO looking to decommission 2 reactors at Oi nuke plant

https://mainichi.jp/english/articles/20171017/p2a/00m/0na/010000c#cxrecs_s
OSAKA -- Kansai Electric Power Co. (KEPCO) is considering decommissioning two aging reactors at its Oi nuclear power plant in Fukui Prefecture, sources familiar with the case said.

- 【Related】Unfinished nuclear fuel reprocessing plant faked safety records: NRA
- 【Related】Voluntary evacuees win compensation over Fukushima nuclear disaster
- 【Related】Despite NRA's OK, restarting reactors in Niigata Pref. still nowhere in sight

In 2019, the operational life of these reactors -- the No. 1 and 2 reactors at the plant in the town of Oi -- will reach the 40-year limit set by the government following the outbreak of the Fukushima nuclear crisis in 2011.
Oi's No. 1 and 2 reactors are capable of generating a massive amount of power and are reportedly cost-effective. However, KEPCO has deemed that these reactors would not be profitable even if the company were to continue to operate the reactors beyond the 40-year limit as an exceptional measure, because it would cost a large amount of money to reinforce them to make them quake-resistant.
The output of the Oi plant's No. 1 and 2 reactors is approximately 1,175,000 kilowatts each.
Besides reactors at the disaster-hit Fukushima No. 1 complex, there are six reactors nationwide that their operators have decided to decommission in the wake of the disaster. The output of Oi's No. 1 and 2 reactors is larger than that of the six reactors.
Neither of the Oi reactors has been put back into operation since the March 2011 Great East Japan Earthquake, tsunami and ensuing nuclear crisis.
The government has set a 40-year cap in principle on the period of operating nuclear reactors following the disaster. However, the period can be extended by up to 20 years on condition that approval is granted by the Nuclear Regulation Authority.
However, a law providing for new safety standards designed to prevent a serious nuclear accident like the Fukushima disaster came into force in 2013, under which nuclear plant operators are required to take large-scale safety measures before reactivating reactors or operating them beyond the 40-year limit. Such measures would cost nuclear plant operators massive amounts of money.
Oi's No. 1 and 2 reactors were first put into operation in March 1979 and December 1979, respectively, and are to reach the 40-year limit in 2019.
It is technically difficult to reinforce these reactors because their containment vessels are small and their structures are complex.
Moreover, there is an active fault near the power station, and the estimated scale of tremors that could be caused by the fault has been gradually raised since the Great East Japan Earthquake. Therefore, it could cost KEPCO a massive amount of money to reinforce the reactors to make them resistant to such powerful temblors.

October 18, 2017

Oi reactors too costly to update for restart

Kansai Electric likely to scrap aged Oi reactors due to huge costs

http://www.asahi.com/ajw/articles/AJ201710180049.html

Kansai Electric Power Co. looks set to pull the plug on two aging reactors at its Oi nuclear power plant in Fukui Prefecture on grounds it would be far too costly to make safety updates to meet industry standards.

The No. 1 and No. 2 reactors at Oi have a generating capacity of more than 1 gigawatt each, making them among the most powerful in Japan.

Possible decommissioning of such large-scale reactors could jeopardize the Abe administration's goal of having nuclear energy meet 20-22 percent of the nation's electricity needs in fiscal 2030.

To achieve that target, 30 or so reactors would need to be in operation. Currently, five are back online.

The government projects that its goal is achievable if the nation's nuclear watchdog body allows existing reactors to operate for 60 years.

Kansai Electric said that the price tag of at least 400 billion yen ($3.57 billion) in necessary safeguard measures to bring the reactors online would prove too costly for it to reap profits, according to sources familiar with the situation.

"In my opinion, they should be decommissioned, rather than going out of our way to bring them back online," a top Kansai Electric executive said Oct. 17.

Kansai Electric is expected to make its decision in November.

The Oi reactors are each capable of generating more than 1,175,000 kilowatts. They went online in 1979, and are close to the 40-year lifespan for reactors that is now the norm under the stricter nuclear regulations established after the 2011 Fukushima disaster.

The Nuclear Regulation Authority will allow a one-time 20-year extension to that principle if an operator is deemed to have taken appropriate safety measures.

The utility has until the end of this year, and next year, to apply for extended deadlines for each of the reactors.

Kansai Electric decided to mothball two reactors at the Mihama nuclear plant in Fukui Prefecture after the triple meltdown at the Fukushima No. 1 nuclear plant triggered by the earthquake and tsunami disaster more than six years ago.

They are among 12 reactors that face being decommissioned, including the six reactors of Tokyo Electric Power Co.'s crippled Fukushima facility.

Except for those at the Fukushima plant, all of the rest have a generating capacity well below 1 gigawatt.

Utilities have been pushing to bring reactors back online, especially ones with a larger generating capacity, to improve their bottom lines.

Shigeki Iwane, president of Kansai Electric, said at a news conference just in September, "We are thinking about applying for an extension of operations (for the Oi No. 1 and No. 2 reactors."

But the company is now leaning toward decommissioning on grounds of the huge outlays that would be needed to keep them going under the new regulations.

Kansai Electric's overall outlay forsafeguards for seven reactors that have already restarted or are expected to in coming years will hit an estimated 830.4 billion yen.

The figure represents more than 20 percent of the overall total of 3.8 trillion yen in such measures logged by 11 operators of nuclear plants.

In addition, Kansai Electric's spending will likely top 1 trillion yen in the end, given the requirement to safeguard nuclear facilities against a possible terrorist attack.
If Oi's two pressurized-water reactors were restarted, it would cost the company at least 400 billion yen more.
The units are designed to use ice in the event of an accident, making them unique among reactors in Japan. Their containment vessels are smaller than conventional ones.
The utility envisages that additional safety measures that would be needed to win NRA approval will be far more difficult to achieve than those needed for other reactors now back online.
Kansai Electric also expects that the NRA's screening process will prove to be prolonged because of the reactors' special features.
That would likely reduce the time left for the Oi reactors to operate under the 20-year extension, the sources said.
As a result, the utility fears that there is little chance of a payoff by resuming operations.
Prior to the Fukushima disaster, about 40 percent of Kansai Electric's electricity output was generated by its 11 reactors, making it the most dependent on nuclear energy of all operators of nuclear facilities.

October 25, 2017

Storage site starting operation on Oct.28

An intermediate storage facility under construction in Okuma, Fukushima Prefecture, in February, with the Fukushima No. 1 nuclear plant in the background (Asahi Shimbun file photo)

Fukushima debris heading to intermediate storage facility

http://www.asahi.com/ajw/articles/AJ201710250040.html

The Environment Ministry on Oct. 28 will start bringing radiation-contaminated soil to an intermediate storage site in Fukushima Prefecture, despite having acquired less than half of the land needed for the overall project.

The ministry's announcement on Oct. 24 marks a long-delayed step toward clearing temporary sites that were set up around the prefecture to store countless bags of radioactive debris gathered after the triple meltdown at the Fukushima No. 1 nuclear power plant in March 2011.
The entire intermediate storage project will cover a 16-square-kilometer area spanning the towns of Futaba and Okuma around the nuclear plant. It is designed to hold up to 22 million cubic meters of contaminated debris for a maximum period of 30 years.
However, the ministry is still negotiating with landowners on buying parcels of land within the area. As of the end of September, the ministry had reached acquisition agreements for only about 40 percent of the land for the project.
The soil storage facility that will open on Oct. 28 is located on the Okuma side. It has a capacity of about 50,000 cubic meters.
Bags of contaminated soil stored in Okuma will be transferred to the facility, where the debris will be separated based on radiation dosages.
A similar storage facility is being constructed on the Futaba side.
The ministry initially planned to start full-scale operations of the entire storage facility in January 2015. However, it took longer than expected to gain a consensus from local residents and acquire land at the proposed site.
In March 2015, a portion of the contaminated soil was brought to the Okuma facility for temporary storage.

Interim storage site for Fukushima contaminated soil to begin full operations
https://mainichi.jp/english/articles/20171025/p2a/00m/0sp/012000c
An interim storage site in Fukushima Prefecture for soil and waste generated when areas affected by the Fukushima nuclear crisis were decontaminated will be put into full-scale operation on Oct. 28, Environment Minister Masaharu Nakagawa said.

- 【Related】Decontamination work in Fukushima Pref. far from finished business
- 【Related】3 nabbed over alleged illicit job mediation for Fukushima cleanup workers
- 【Related】Fukushima mulls criminal complaint over fake forest decontamination work

Contaminated soil temporarily placed on the premises of the facility, which straddles the prefectural towns of Okuma and Futaba, will be brought into an underground storage site on the property.
The storage site will be the first one in the country to be put into full-scale operation to store contaminated soil and other waste.
"There are numerous challenges that must be overcome, but the start of operations at the facility is an important step toward the final disposal of contaminated soil," Nakagawa told a news conference on Oct. 24.
The Environment Ministry is constructing the interim storage site on an approximately 16-square-kilometer area around the disaster-stricken Fukushima No. 1 Nuclear Power Plant.
Operations at a section of the facility located in Okuma will begin on Oct. 28. After contaminated soil is measured for radiation, the soil will be stored separately at the facility depending on levels of radiation.
Waterproof work has been performed at the site to prevent stored soil from contaminating ground water.
At the site, a plant to incinerate weeds, trees and other flammable materials removed from contaminated soil and a facility to manage incinerated ash containing high levels of radioactive cesium will also be built.
The ministry estimates that the amount of soil and other waste removed from decontaminated sites in the prefecture could reach up to some 22 million cubic meters.
Decontamination work is still going on in some areas affected by the nuclear disaster, which broke out in March 2011 following the Great East Japan Earthquake and tsunami.

Most of the soil removed from decontaminated areas was put into bags and temporarily stored at various locations in Fukushima Prefecture. Some of the bags have been brought onto the premises for the interim storage site since March 2015.
The central government intends to build a final disposal site outside the prefecture to complete the disposal of contaminated soil by 2045. However, the government has not worked out a specific plan on the final disposal site, such as its location and the timing of its construction.

October 28, 2017

Fukushima radioactive waste storage starts full operation

https://mainichi.jp/english/articles/20171028/p2g/00m/0dm/082000c

TOKYO (Kyodo) -- The government Saturday started full operation of its Fukushima facility to store radioactive waste resulting from the 2011 nuclear disaster after running it on a trial basis for about four months.

While the facility near the crippled Fukushima Daiichi nuclear complex is designed to store contaminated soil and other waste, collected in decontamination work in the eastern Japan prefecture, for up to 30 years, the storage is only half completed over six years after the disaster.

An estimated 22 million cubic meters of contaminated waste exists in Fukushima, but the facility does not yet have enough capacity to accept all of it, and local residents fear the waste will sit there permanently in the absence of a final disposal site.

The government plans to secure a total of 1,600 hectares of land for the facility, expecting 1.6 trillion yen ($14.1 billion) in construction and related costs.

It has been able to buy only 40 percent of land needed for the storage from land owners so far.

Still, completion of the storage is urgently needed when 13 million cubic meters of waste from cleanup work is scattered around the prefecture and waiting to be transported to the storage facility.
Prolonged disposal work, among other concerns, is also said to be keeping evacuated residents from returning to Fukushima even after evacuation orders are lifted.
On Saturday, the government started full-fledged operation of the facility where waste for incineration such as trees and plants are removed from the rest.

Contaminated soil is sorted into different categories depending on the level of radioactive cesium before storage.

October 29, 2017

Beginning of official storage of contaminated soil

Contaminated soil produced during cleanup in communities affected by the 2011 Fukushima nuclear disaster is carried on belt-conveyers covered with plastic sheets at an interim storage site in Okuma, Fukushima Prefecture, on Oct. 28. (Hiroshi Ishizuka)

Official storage of contaminated soil begins in Fukushima

http://www.asahi.com/ajw/articles/AJ201710290026.html

By HIROSHI ISHIZUKA/ Staff Writer

OKUMA, Fukushima Prefecture--Hailed by the government as a major step to rebuilding, radioactive soil from the cleanup of municipalities impacted by the 2011 Fukushima nuclear disaster began arriving at an interim storage site here on Oct. 28.

However, officials and residents with the towns of Okuma and Futaba fear the repository may end up being permanent as finding a final resting place outside Fukushima Prefecture is expected to be extremely difficult.

Still, local governments welcomed the start since rebuilding has been hampered by the countless number of bags containing polluted soil that have been kept in backyards.

“We are hoping to remove as many bags of contaminated soil as possible from people’s living spaces,” said Tadahiko Ito, vice environment minister who inspected the site on Oct. 28.

All the soil there is supposed to be taken out of the prefecture by March 2045 for final disposal under the law.

The repository began operating at the site, where soil from low-level pollution will be kept after being brought in via a belt-conveyor system. Bulldozers will afterward flatten the surface.

After a certain amount of soil is brought in, the ground will be covered with uncontaminated soil. The site can hold about 50,000 cubic meters of soil, according to the Environment Ministry, which oversees the project.

The ministry began building the interim storage facility about a year ago. As of the end of September, contracts had been signed for about 40 percent of the 1,600 hectares of land needed for storage in Okuma and Futaba, which co-host the crippled Fukushima No. 1 nuclear power plant.

A total of seven facilities will be built to keep polluted soil.

The ministry also plans to complete two facilities to store more radioactive waste in fiscal 2019.

Overall construction costs are estimated at 1.1 trillion yen ($9.67 billion) for all the interim storage facilities.
They can store up to 22 million cubic meters of soil and other waste.
According to the ministry, about 15.2 million cubic meters of contaminated soil from decontamination work are piled up or buried at about 150,000 location in Fukushima Prefecture, including plots near houses and schoolyards.
The ministry envisages moving 12.5 million cubic meters of the total to the interim sites by the end of March 2021.

see difference in figures in the Mainichi article of Oct. 28 above

November 24, 2017

Time to decommission Tokai No.2!

EDITORIAL: Aging Tokai No. 2 nuclear plant should be decommissioned

http://www.asahi.com/ajw/articles/AJ201711240017.html

Japan Atomic Power Co.'s Tokai No. 2 nuclear power plant in Tokai, Ibaraki Prefecture, seems doomed to be decommissioned given the strong doubts and practical difficulties surrounding the company's plan to restart the reactor at the plant.
Japan Atomic Power plans to apply to the Nuclear Regulation Authority to extend the operating life of the idled reactor at the plant beyond the legal life span of 40 years in principle.
The currently offline reactor will reach the end of its legal life span in one year. The operator is seeking to persuade the NRA to make an exception of the reactor for bringing it back on line.
It has been estimated that the required safety measures will cost the company at least 170 billion yen ($1.52 billion). In an unusual move, the nuclear safety watchdog has told Japan Atomic Power, which is on a fragile financial footing, to come up with a workable plan to raise the funds to finance the measures.
With the local communities and governments around the plant struggling to develop required plans for emergency evacuations, there is strong skepticism about the feasibility of the company's plan to restart the reactor.
Since there is little chance of the company's other reactors being restarted, the fate of Japan Atomic Power hinges on whether the Tokai No. 2 plant will be allowed to come on stream again.
But that doesn't justify taking it as a given that the company will get the green light for restarting the reactor.
Japan Atomic Power, the major electric utilities with major stakes in the company and the Ministry of Economy, Trade and Industry, which regulates the power industry, should carefully reassess the future of the company without assuming that the reactor will start running again.
The 40-year legal life for nuclear reactors is an important rule to reduce the risk of accidents involving aging reactors. It was introduced following the disastrous accident at the Fukushima No. 1 nuclear power plant in 2011.
The operational life can be extended by up to 20 years if approved by the NRA.
When the law was revised, however, the government said such extensions would be highly exceptional cases.
But Kansai Electric Power Co.'s applications for life extensions for its three aging reactors have all been approved.

If the Tokai No. 2 plant is added to the list, the rule will move closer to becoming a dead letter.
There are no special reasons for restarting the old reactor, such as a serious risk of a power shortage.
Japan Atomic Power's plan should not be given a go-ahead simply to help the embattled company.
The Tokai No. 2 plant is located at the northern tip of the Tokyo metropolitan area. Some 960,000 people live within 30 kilometers from the plant, more than in any other 30-km radius of a nuclear plant. Local governments located within the zone are required to develop evacuation plans.
It is obviously difficult to secure safe evacuation routes, facilities to accept evacuees and the means to transport them for the entire 30-km zone around the plant.
None of the 14 municipalities that are subject to the requirement has worked out an evacuation plan.
The outlook for local government support for the plan is also dismal.
The government of Ibaraki Prefecture and the mayor of Tokai intend to base their decisions on local public opinion as to whether to give their consent to the plan.
Recent Asahi Shimbun surveys of local voters found that opponents to the plan far outnumbered supporters.
Five other cities around the plant are demanding the consent rights similar to those given to Tokai in order to take part in the decision-making process.
Japan Atomic Power and the major utilities that own the firm should confront these realities.
The utilities that are under contract to buy electricity from Japan Atomic Power continue paying more than 100 billion yen of basic fees in total every year even though the company currently generates no power to sell with all its reactors out of operation.
It should not be forgotten that the money comes from the electricity bills paid by consumers.
It has been proposed that Japan Atomic Power should serve as a vehicle for the consolidation of the power industry driven by the decommissioning of aged nuclear reactors.
Instead of simply shelving the problem, the parties involved should accelerate their efforts to map out a viable future for the company.

November 29, 2017

Decommissioning Monju, yes, but how?

Monju reactor set for decommissioning lacks sodium removal method

https://mainichi.jp/english/articles/20171129/p2a/00m/0na/013000c

The Japan Atomic Energy Agency (JAEA) has revealed that the Monju prototype fast-breeder nuclear reactor in Tsuruga, Fukui Prefecture, which is set to be decommissioned, was designed without any consideration of ever having to remove liquid sodium from inside the reactor vessel.

- 【Related】Gov't set to continue nuclear fuel cycle project despite Monju closure

While removal of the radioactive liquid sodium is a key task in terms of early phase decommissioning of the nuclear reactor, the JAEA is likely to be unable to specify a method for extracting the sodium in its decommissioning plan that is due to be submitted to the Nuclear Regulation Authority (NRA).
Water is normally used as a nuclear fuel coolant in power plants but in the case of the Monju reactor, liquid sodium is used instead to increase production of plutonium. However, liquid sodium ignites when it comes into contact with air, and it causes an explosive chemical reaction when it is mixed with water. In 1995, some liquid sodium leaked from the Monju reactor, causing the reactor to be shut down for a long period of time.
According to the JAEA, the primary coolant system facility for nuclear fuel at Monju is covered with an alloy wall, and workers cannot get close to the reactor vessel. Furthermore, the reactor vessel is

designed in such a way that the amount of liquid sodium does not go below a certain level so that nuclear fuel is not exposed. As a result, of about 760 metric tons of liquid sodium used for the primary coolant system, several hundred inside the reactor vessel cannot be extracted.
Since operations at the Monju reactor were commenced in 1994, liquid sodium inside the reactor vessel has never been removed.
In an interview with the Mainichi Shimbun, a senior official at the JAEA acknowledged that the reactor had been designed without any regard for removing liquid sodium from the reactor vessel, saying, "When the reactor was being designed, the main priority was to finish the project quickly. Decommissioning was not taken into account." In addition, the liquid sodium has been exposed to radiation, making it difficult for humans to approach it and perform tasks.
The JAEA intends to consider ways of extracting the sodium by a specialist decommissioning division to be set up as early as fiscal 2018. However, the NRA expresses concern, stating that, "There are no holes through which to extract sodium from the reactor, and there are no completely safe methods for removing the sodium."
Keiji Kobayashi, a former instructor at Kyoto University Research Reactor Institute who is an expert on the Monju reactor, states, "**It has to be said that there are defects in the design. It is also thought that the number of staff members who understand the structure of the reactor is declining. If the sodium is removed erratically, it could lead to a major accident**."

December 4, 2017

Monju decommission pact

Monju decommission pact to be signed on Tues.

https://www3.nhk.or.jp/nhkworld/en/news/20171205_02/

Authorities in Fukui Prefecture, central Japan, are set to sign a pact with the operator of the prototype fast-breeder nuclear reactor, Monju, regarding its dismantling.

Following a series of safety management problems, the Japanese government decided last year to scrap the troubled reactor. The process will take about 30 years.

Sources familiar with the matter told NHK that the prefecture, and the host city of Tsuruga, plan to sign the deal with Monju's operator, the Japan Atomic Energy Agency, on Tuesday.

The aim of the pact is to ensure the safe decommissioning of the facility.

Liquid sodium -- a chemical that explodes when exposed to water or air -- is used as a coolant at Monju. For that reason, it is more difficult to scrap the reactor than it is to dismantle other types.

The deal is expected to include briefings to local authorities at turning points in the process of dismantling the facility, as well as measures to reduce as much radioactive waste as possible during the decommissioning process.

After the pact has been signed, the operator will submit a detailed plan to the country's nuclear regulator.

December 6, 2017

Monju decommissioning plan

Atomic energy agency submits Monju reactor decommissioning plan

https://mainichi.jp/english/articles/20171206/p2a/00m/0na/023000c

The Japan Atomic Energy Agency (JAEA) submitted a plan to the Nuclear Regulation Authority (NRA) on Dec. 6 stating that it aims to complete decommissioning of the Monju prototype fast-breeder nuclear reactor in Tsuruga, Fukui Prefecture, by fiscal 2047.

- 【Related】Monju reactor set for decommissioning lacks sodium removal method

If the NRA approves the plan, the JAEA will be able to go ahead with decommissioning work at the reactor. However, a range of issues such as where to place the spent nuclear fuel scheduled to be extracted from the site as well as how to remove liquid sodium still remain.
According to the plan, the decommissioning process will be split into four stages. The first stage is set to take place between fiscal 2018 and fiscal 2022 and will consist of removal of all 370 nuclear fuel assemblies from the reactor.
In the second and subsequent stages, which are scheduled to occur between fiscal 2023 and 2047, approximately 1,670 metric tons of liquid sodium coolant are planned to be extracted. Moreover, the building housing the reactor is set to be dismantled during this period.
The JAEA has not yet drawn up a specific schedule. However, it is planning to submit a more detailed plan to the NRA, with the view of undergoing some form of screening process.
The Monju reactor is unique because there are no previous examples of fast-breeder reactors being decommissioned in Japan. It differs to conventional nuclear power plants, as the method for extracting nuclear fuel from the site is complicated. Therefore, the NRA has decided to opt for the rare move of conducting screening from the relatively early stage of nuclear fuel removal.
With regard to the total amount of radioactive waste, it is estimated that approximately 26,700 tons will need to be removed from the reactor before the end of decommissioning.
In the morning on Dec. 6, JAEA executive director Hajime Ito visited the NRA to submit the decommissioning plan. "Taking various regrets into account, I want to win back the trust of the people by carrying out safe and reliable decommissioning," Ito said.
The decision to decommission the Monju reactor was made by the government in December 2016. However, the submission of the decommissioning plan was delayed as local representatives demanding regeneration of the area and enhanced safety measures failed to reach an agreement with the government.

Nuclear reactor operator submits 30-year plan to scrap trouble-prone Monju facility

https://www.japantimes.co.jp/news/2017/12/06/national/nuclear-reactor-operator-submits-30-year-plan-scrap-trouble-prone-monju-facility/#.WifgZHmDOos

Kyodo
The operator of the Monju prototype fast-breeder nuclear reactor submitted a plan Wednesday to decommission the trouble-plagued facility located in Fukui Prefecture.

The most recent plan presented to the Nuclear Regulation Authority lays out a 30-year time frame to complete the project despite a number of problems that remain unresolved, including where to store the spent nuclear fuel.
The government had originally hoped the Monju reactor would serve as a linchpin for its nuclear-fuel-recycling efforts as it was designed to produce more plutonium than it consumed.
But it experienced a series of problems, including a leakage of sodium coolant in 1995 and equipment failures in 2012. The plant has only operated intermittently over the past two decades.
Under the latest proposal, the facility's operator, the Japan Atomic Energy Agency, plans to divide the 30-year disassembly period through 2047 into four phases. In the first phase, nuclear fuel will be extracted from the reactor core and other places by March 2022, followed by the second phase whereby pipes and pumps where sodium coolant was circulated will be disassembled. The agency will begin the primary scrapping of the reactor in the third phase.
In what is to be the first decommissioning of a fast-breeder reactor in the nation, some 26,700 tons of solid radioactive waste is expected to be produced. The local government is calling on the operator to swiftly remove the nuclear fuel and sodium from the prefecture.
After the central government decided to scrap the reactor in December last year, the Fukui Prefectural Government expressed concern over JAEA's leading role as it had been judged unqualified to operate the reactor safely by the Nuclear Regulation Authority.
In response, the government beefed up oversight over the effort and the agency accepted external experts from electric utilities and manufacturers to play central roles in the decommissioning work.
Prior to the plan's submis
sion, the agency on Tuesday concluded an agreement on safety measures and regional development plans with the Fukui Prefectural Government and the city of Tsuruga, which hosts the reactor.

Monju operator presents decommissioning plan

https://www3.nhk.or.jp/nhkworld/en/news/20171206_16/

The Japan Atomic Energy Agency has presented a detailed plan for decommissioning its prototype fast-breeder nuclear reactor over 30 years.

The government decided last year to scrap the Monju reactor in Fukui Prefecture, central Japan, after a series of accidents and other safety problems.

The agency submitted its plan to the Nuclear Regulation Authority on Wednesday. It calls for dismantling the reactor in 4 phases, ending in fiscal 2047.

The first phase starts next year with the removal of 530 units of nuclear fuel over 5 years. Liquid sodium coolant that is free of radioactive substances will also be removed by April 2019.

Dismantling of the reactor and the building will follow.

The work begins once the Nuclear Regulation Authority approves the plan.

Japan Atomic Energy Agency board member, Hajime Ito, said they will focus first on fuel removal while continuing safety checks and educating and training staff.

The agency agreed with the Fukui prefectural government on Tuesday to report on the progress of the dismantling to the public.

The agency also plans to transport nuclear fuel and sodium outside the prefecture, but no decision has been made about where to take it.

December 13, 2017

Decommissioning Monju, but how?

Editorial: Monju reactor will be decommissioned, but mountain of uncertainty remains

https://mainichi.jp/english/articles/20171213/p2a/00m/0na/026000c

The Japan Atomic Energy Agency (JAEA) has submitted its plan to decommission the Monju experimental fast-breeder reactor in Tsuruga, Fukui Prefecture, to the Nuclear Regulation Authority (NRA).

- 【Related】Atomic energy agency submits Monju reactor decommissioning plan
- 【Related】Monju reactor set for decommissioning lacks sodium removal method
- 【Related】Editorial: Radiation exposure accident a result of JAEA's sloppy safety management

The Monju reactor uses liquid sodium as a coolant, which reacts violently when exposed to water or air. There has never been a reactor like the Monju unit in the country, and so there is no precedent for decommissioning it. In short, this will be a very tough road, strewn with many obstacles.
In addition to giving the JAEA's proposal a vigorous vetting, it is essential that the NRA keep a careful watch on the plan's progress after approval.
According to the JAEA's plan, the Monju decommissioning will take 30 years, wrapping up in fiscal 2047. The work will be broken into four phases, with phase one -- including removal of the reactor fuel assemblies -- set for completion in fiscal 2022. In phase two and after, the JAEA will remove the radioactive sodium coolant and dismantle the Monju facility. The estimated cost for all this is about 375 billion yen.
However, there is currently only a detailed work schedule for phase one. Furthermore, Fukui Prefecture has demanded the spent reactor fuel be moved outside its borders, but there is as yet no place for it to go. Moreover, the decommissioning plan has no blueprint for how to get the sodium coolant out of the reactor, so the exact nature of the process has yet to be determined. The JAEA says that extracting the coolant is "sufficiently technically feasible," but NRA Chairman Toyoshi Fuketa has said that the JAEA "is being overly optimistic if it thinks it can do it just by going ahead with the project."
It was the JAEA's mismanagement of the Monju reactor, its repeated scandals including inspection oversights, which triggered the reactor's decommissioning in the first place. It is perfectly natural that the Fukui Prefectural Government is expressing misgivings about leaving the project in the hands of such an organization.
The central government will establish a committee to explain the structure and progress of the Monju decommissioning project to local residents. However, it should also reveal the information to the broader Japanese public, and be subject to its assessment.
France has already shuttered its fast-breeder reactors, and we would like to see Japan make the most of French experience and technology to help guarantee the Monju decommissioning is undertaken safely and soundly.
To date, development of the Monju fast-breeder reactor has cost the public purse over a trillion yen, though the unit has spent just 250 days on line. The cost of decommissioning the plant may also

mount. Meanwhile, the Rokkasho nuclear fuel reprocessing plant in Aomori Prefecture -- another vital link in the government's fuel cycle plan -- has no immediate prospects of going into full operation.
The government began revamping its basic energy plan this past summer. The present proposal states that reliance on nuclear power will be reduced as much as possible. If that is indeed the goal, then first the government must decide once and for all that the stalled nuclear fuel cycle program needs to be reconsidered.

December 18, 2017

New robots to decommission Fukushima Daiichi

Students hone robot skills to decommission Fukushima plant

http://www.asahi.com/ajw/articles/AJ201712170031.html

By TERU OKUMURA/ Staff Writer
NARAHA, Fukushima Prefecture--Showing an improvement of advanced robot technology, students got a leg up in assisting in the decommissioning of the crippled Fukushima No. 1 nuclear power plant.
The National Institute of Technology, Nara College, whose robot was the only one to successfully climb stairs and carry a load to the second floor 4 meters above, won the top prize at a contest here on Dec. 16.
“We focused on the robot’s legwork,” said Kosuke Yasukawa, 20, the team leader. “I am happy our efforts were rewarded and would like to thank my teammates.”
The contest, dubbed the "Hairo Sozo Robocon” (The robot contest to compete in creativity for reactor decommissioning), was the second following the first held last year. It was organized by the education ministry and a council of teaching staff at colleges of technology.
Two teams succeeded in having their robots go up and down stairs without a load this year.
“More advanced robots entered the competition this year after students learned a lesson from last year,” said Shinji Kawatsuma, an official at the Naraha Remote Technology Development Center of the Japan Atomic Energy Agency, a government affiliate.
Sixteen teams from 15 colleges of technology across the country participated in the competition this year.
The contest is designed to advance robotic technology to perform tasks in the decommissioning of the plant.
Entrants are required to operate their robots from a location where they cannot see them, as is the situation at the plant after the triple meltdown in March 2011.
They can choose one of two settings--reaching a place 4 meters higher by using stairs or surveying the floor scattered with broken objects.

December 22, 2017

Ohi Nos.1 and 2 reactors to be scrapped

Kansai Electric scrapping 2 reactors

https://www3.nhk.or.jp/nhkworld/nhknewsline/nuclearwatch/kansaielectricscrapping2reactors/

A power company in Japan says it's decided to scrap 2 of its nuclear reactors. They'll be the largest in terms of output ever dismantled in the country.
Kansai Electric Power Company's president told the governor of Fukui Prefecture about the decision to pull the plug on the reactors at the Ohi nuclear plant.
"We will place top priority on securing safety and will return the land to a vacant lot as soon as possible," says Shigeki Iwane, the President of Kansai Electric Power Company.
"Winning people's trust in nuclear power, both locally and nationally, means making an effort to ensure safety, contribute to regional development and steadily dismantle the reactors," says Fukui Governor Issei Nishikawa.
The Number One and Two reactors each have an output capacity of over 1 million kilowatts. The aging reactors will reach the 40-year mark in 2019. That's the operational limit under stricter rules introduced after the Fukushima nuclear accident.
The term can only be extended if the operator updates the reactors. But Kansai Electric has decided that would take too much time and money. Other utilities have come to the same conclusion.
Eight reactors are now slated for decommissioning due to age.

Kansai Electric decides to scrap two Oi reactors over safety concerns

https://www.japantimes.co.jp/news/2017/12/22/national/kansai-electric-decides-scrap-two-oi-reactors-safety-concerns/#.Wj0fNnkiGic

by Eric Johnston
Staff Writer
OSAKA – Kansai Electric Power Co. formally notified the Fukui Prefectural Government on Friday that it will decommission the Oi No. 1 and No. 2 reactors.
The utility's choice to scrap the atomic power plants, which will turn 40 years old in 2019, rather than apply for a two-decade extension, means Kepco units account for four of the 14 reactors nationwide that have been scheduled for destruction since the 2011 Great East Japan Earthquake. Kepco's Mihama No. 1 and No. 2 reactors are also scheduled for decommissioning.
They would also become the second and third reactors with over a gigawatt of output to be decommissioned in Japan after the 1,100-megawatt No. 6 unit at the crippled Fukushima No. 1 power plant.
Shutting down the two Oi reactors has raised new questions about whether the central government's goal of having nuclear power account for 20 to 22 percent of Japan's electricity by 2030 is feasible.
Citing new safety regulations on restarting reactors over 40 years old and technical problems involved with refurbishing the plants to meet those standards, Kansai Electric President Shigeki Iwane told Fukui Gov. Issei Nishikawa that if problems were discovered during regular inspections or while in operation, swift repairs that guaranteed safety would be difficult.
"From a technical perspective, because no effective method was shown to address the problems, and giving top priority to the safety of future operations of the facility and the quality of the reactor components, we decided to decommission the reactors," Iwane told Nishikawa.
The Kepco chief told reporters afterward that this was the rationale for the decision, rather than the economic efficiency of running the reactors. Kepco did not provide an estimate for how much it would cost to bring the reactor in line with new safety standards. But it has already spent ¥830 billion on upgrading safety at its other seven commercial reactors.
For Fukui Prefecture, where 13 commercial reactors and the Monju prototype fast-breeder reactor are located, Kepco's decision has raised questions about the local economic impact. Central government

subsidies and utility donations to Fukui towns and villages that host nuclear plants have traditionally formed a large portion, sometimes half, of their annual budget. Regular inspections bring engineers and officials to local hotels and restaurants, and many residents work in service businesses connected to plant operations.
Kepco officials assured Nishikawa on Friday that they would explain the decommissioning decision to local firms and include a large number of them in the work — a major issue for the governor and local businesses.
“Efforts on a safety policy and on economic revitalization will lead to local trust,” Nishikawa told Iwane.
How Kepco’s decision will affect the central government’s plans to have nuclear power continue to play an important role over the next decade and a half remains unclear. Minister of Economy, Trade, and Industry Hiroshige Seko told reporters after the decision was announced that eliminating two reactors would not immediately affect the 2030 goal of having nuclear power account for 20 to 22 percent of Japan’s electricity generation.
A Hiroshima High Court ruling earlier this month declared there were volcanic risks associated with the restart of Shikoku Electric Power Co.’s Ikata power plant in Ehime Prefecture, a decision that shut it down. Kepco’s announcement for the Oi reactors will likely force other utilities now seeking restarts to consider further whether the legal costs surrounding restarts and the investment needed to meet current, and possibly future, safety standards will still keep nuclear power a cost-competitive electricity source in the coming years.
But at a news conference in Osaka Friday afternoon, Iwane said Kepco would continue to pursue the restart of Kansai’s remaining reactors.
“In the future, we’re aiming for nuclear power to provide 40 percent of our company’s electricity,” he said.

Tool for Fukushima reactor vessel probe shown

https://www3.nhk.or.jp/nhkworld/en/news/20171222_30/

The operator of the Fukushima Daiichi nuclear power plant has given a media preview of equipment that will be used to investigate the inside of the containment vessel of one of the damaged reactors.

Tokyo Electric Power Company, or TEPCO, showed a tool called a "guide pipe" at a factory in Yokohama on Friday.

The pipe can be extended to 16 meters in length and has a camera and a dosimeter at its tip.

TEPCO plans to use it to get a better look inside the containment vessel of the No.2 reactor.

The operator believes fuel debris, made up of a mixture of molten fuel and broken interior parts, lies at the bottom of the vessel.

In January, workers confirmed the presence of a mass on the floor under the reactor.

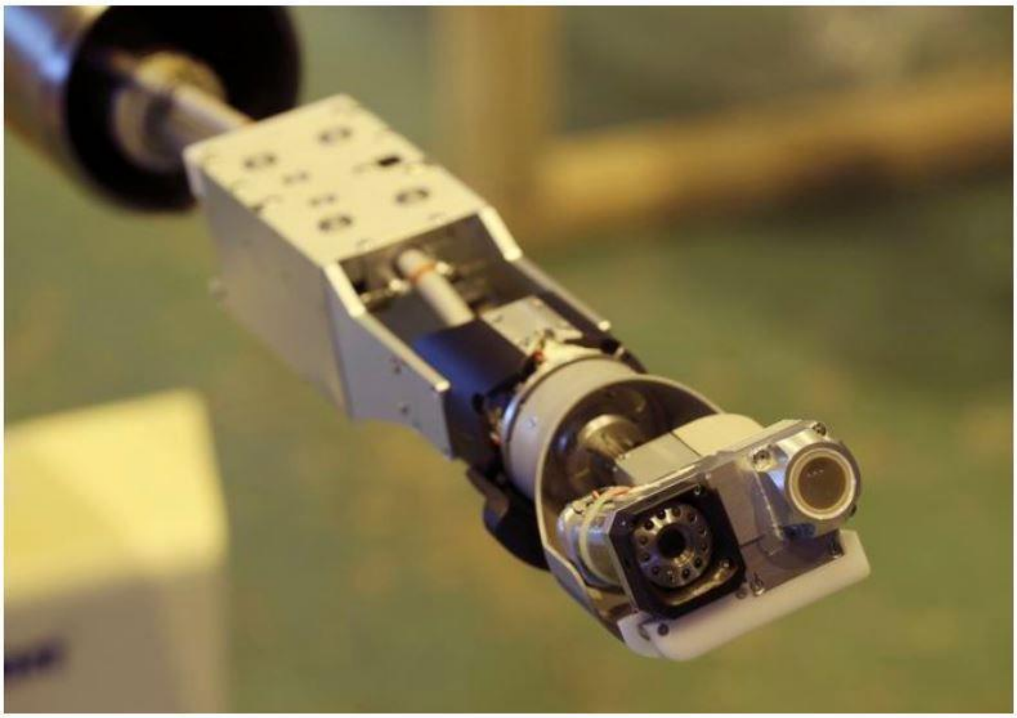
But they could not confirm if it was fuel debris because they could not measure the radiation levels there.

In January next year, workers hope to confirm that it is fuel debris by sending in a camera and a dosimeter using the guide pipe.

The government and TEPCO plan to determine which reactor they should remove debris from first and how to conduct the procedure during fiscal 2019, which begins in April.

December 23, 2017

New device to probe Fukushima's insides



Toshiba Corp. unveiled a pan-tilt camera which it jointly developed with the International Research Institute for Nuclear Decommissioning (IRND), to inspect the interior of the damaged primary containment vessel of Fukushima No. 1 nuclear power plant's No. 2 reactor in Yokohama on Dec. 22. (AP Photo)

Toshiba unveils device for Fukushima nuclear reactor probe

http://www.asahi.com/ajw/articles/AJ201712230012.html

THE ASSOCIATED PRESS
YOKOHAMA--Toshiba Corp.'s energy systems unit on Friday unveiled a long telescopic pipe carrying a pan-tilt camera designed to gather crucial information about the situation inside the reactor chambers at Japan's tsunami-wrecked Fukushima nuclear plant.
The device is 13 meters long and designed to give officials a deeper view into the nuclear plant's No. 2 reactor primary containment vessel, where details on melted fuel damage remain largely unknown.
The Fukushima plant had triple meltdowns following the 2011 quake and tsunami. Finding details about the fuel debris is crucial to determining the right method and technology for its removal at each reactor, the most challenging process to safely carry out the plant's decades-long decommissioning.

Japan's stricter, post-Fukushima safety standards also require nuclear plant operators elsewhere to invest more time and money into safety measures.
On Friday, Kansai Electric Power Co. announced that it would decommission two idle reactors at the Oi nuclear power plant in western Japan, citing the difficulty of adding all the safety requirements at the nearly 40-year-old reactors that would be needed to get approval for their restart.
Reports have said it would cost about 58 billion yen ($500 million) and take 30 years to decommission a reactor, about half the estimated cost to restart one.
Also Friday, Japan Nuclear Fuel said that it was postponing the planned launch of its trouble-plagued spent fuel reprocessing plant by three more years until 2021. It cited delayed approval by the authorities. It also said it was postponing the planned manufacturing of fuel from recycled plutonium and uranium.
The mission involving Toshiba's new probe at Fukushima's No. 2 reactor could come as soon as late January. Company officials said the new device will be sent inside the pedestal, a structure directly below the core, to investigate the area and hopefully to find melted debris.
The device looks like a giant fishing rod about 12 centimeters in diameter, from which a unit housing the camera, a dosimeter and thermometer slowly slides down. The probe, attached by a cable on the back, can descend all the way to the bottom of the reactor vessel if it can avoid obstacles, officials said.
Two teams of several engineers will be tasked with the mission, which they will remotely operate from a radiation-free command center at the plant.
A simpler predecessor to the pipe unveiled Friday had captured a limited view of the vessel during a preparatory investigation in February. A crawling robot sent in later in February struggled with debris on the ground and stalled in the end due to higher-than-expected radiation, its intended mission incomplete.
The upgraded probe has been co-developed by Toshiba ESS and International Research Institute for Nuclear Decommissioning, a government-funded unit of construction and nuclear technology companies over the past nine months.

See also: https://mainichi.jp/english/articles/20171223/p2g/00m/0bu/010000c

December 25, 2017

Economics & decisions on nukes

EDITORIAL: Oi reactors scrapped as nuke power losing cost advantage

http://www.asahi.com/ajw/articles/AJ201712250012.html

In a landmark step toward the goal of lowering Japan's dependence on atomic energy, Kansai Electric Power Co. has decided to scrap the No. 1 and No. 2 reactors of its Oi nuclear power plant in Fukui Prefecture.
The pair are the largest in output capacity of all 14 of the fleet of nuclear reactors in Japan that have been designated for decommissioning following the 2011 meltdowns at the Fukushima No. 1 nuclear power plant.
Electric utilities are under the pressure of a rule, introduced in the wake of the Fukushima disaster, saying that nuclear reactors have a service life of only 40 years, in principle. Kansai Electric initially sought an exception to that rule to win extended operation of the Oi No. 1 and No. 2 reactors, whose age limit will expire in 2019, but has given up on that plan in the end.
It could be said the 40-year rule, which was intended to reduce the risk of accidents at aging nuclear reactors, fulfilled its function this time.

There is, however, something unintelligible in the explanations provided by Kansai Electric on its decision to scrap the Oi reactors.
Shigeki Iwane, president of the utility, said in January that his company was planning to apply to the Nuclear Regulation Authority for an extended operation of those reactors.
“Doing so is sufficiently rational in economic terms,” he said.
Kansai Electric’s latest announcement, however, emphasized that, because the two reactors have a unique design, work to implement required safety measures on those reactors would make it difficult to conduct maintenance checkups once they are restarted. The company had never assessed economic efficiency, Iwane said.
One could only imagine what made him change his rhetoric.
The costs of safety measures that would be required to have the Oi No. 1 and No. 2 reactors restarted appeared likely to amount to some 200 billion yen ($1.77 billion) per reactor. And they could have been allowed to operate only for a maximum of 20 additional years. A significant dent in economic efficiency appeared inevitable even if both reactors were to be brought back online.
In all likelihood, the company made allowances for the industry ministry and fellow electric utilities, which fear that public attention on the faltering cost advantage of nuclear power could frustrate their move to have more nuclear reactors restarted.
All major utilities are facing an increasingly tough situation surrounding nuclear power generation in the wake of the Fukushima disaster.
The more stringent safety regulations mean enormous additional costs are required to have nuclear reactors restarted. Sales of electricity are also on a downtrend, partly because power-saving efforts have taken root, and partly also because liberalization of the retail power market has intensified competition. There is strong public opposition to nuclear restarts, and court procedures are going on across Japan over the wisdom of operating nuclear reactors.
The major utilities should face up squarely to the reduced profitability of, and the risks inherent in, their nuclear power businesses and part with their management style of continuing to rely on atomic energy.
The service life limit of 40 years is ticking down on other nuclear reactors as well.
The utilities should calmly evaluate the total prospective cost of continuing to operate them, which include everything from additional safety measures through the decommissioning process to the disposal of radioactive waste. They should also level-headedly assess if they can dispel the safety concerns among local residents. Doing so will help them decide which reactors should be decommissioned.
That process should be followed over and over to steadily reduce the number of nuclear reactors in the country.
The government should also reorganize its nuclear power policy. It should shift its focus from measures to keep the nuclear sector alive longer to those that befit an age when nuclear decommissioning processes are going into full swing.

January 22, 2018

TEPCO starts removing rubble at No.1 reactor

TEPCO starts clearing rubble at No.1 reactor

https://www3.nhk.or.jp/nhkworld/en/news/20180122_20/

The operator of the damaged Fukushima Daiichi nuclear power plant has started clearing rubble at the Number 1 reactor. Workers will remove nuclear fuel from its storage pool as they continue the decommission process.

Tokyo Electric Power Company, or TEPCO, began on Monday vacuuming finer debris scattered over the spent fuel storage pool in the upper part of the building.

The reactor is one of 3 that suffered a meltdown following the earthquake and tsunami of March 11th, 2011.

After the disaster, a hydrogen explosion destroyed the reactor's roof and iron framework.

The fuel pool is covered with about 1,500 tons of rubble.
The rubble has been an obstacle for workers trying to remove 392 units of spent and unspent nuclear fuel.

TEPCO says it has taken steps to prevent the spread of radioactive dust before starting the rubble clearance.
The operator says it will stop the work immediately if monitoring detects the spread of such dust.

Under a revised decommission plan last year, TEPCO plans to start removing nuclear fuel rods from the reactor's storage pool in fiscal 2023, 3 years behind schedule.

TEPCO plans to finish removing the debris, which includes a mix of molten nuclear fuel and internal structural materials, by the end of March 2022.

TEPCO Starts Clearing Debris at No.1 Reactor

https://www3.nhk.or.jp/nhkworld/nhknewsline/nuclearwatch/tepcostartsclearingdebri/

Workers at the crippled Fukushima Daiichi nuclear plant have begun clearing away rubble around one of the plant's reactors.
The 2011 earthquake and tsunami triggered a triple meltdown at the plant. In the number 1 reactor it also caused a hydrogen explosion. 1,500 tons of rubble then collapsed onto a spent nuclear fuel storage pool.
Plant operator TEPCO says it has taken steps to prevent the spread of radioactive dust while work is underway. They expect it to be completed by the end of March, 2022.
The next step will be to remove hundreds of units of spent fuel. There is also the issue of having to locate and remove molten fuel debris. It is seen as the biggest hurdle to decommissioning, a process that is expected to take 40 years.

January 23, 2018

TEPCO releases a 3min-footage filmed inside No.2 containment vessel

TEPCO unveils footage of deposits inside Fukushima reactor

https://mainichi.jp/english/articles/20180123/p2a/00m/0na/011000c

Tokyo Electric Power Co. (TEPCO) on Jan. 22 released a portion of video footage [3minutes] taken inside the containment vessel of the No. 2 reactor at the disaster-hit Fukushima No. 1 Nuclear Power Plant.

- 【Related】Melted nuclear fuel seen inside second Fukushima reactor
- 【Related】More articles on Fukushima & Nuclear Power

The footage shows deposits in the shape of pebbles and clay spreading across the bottom of the vessel. TEPCO believes the deposits are part of nuclear fuel debris generated during the March 2011 reactor meltdowns and is analyzing the video.
The roughly 3 1/2-minute footage shows water injected into the vessel to cool the reactor dripping down and pooling on the bottom of the containment vessel. Deposits are also seen attached to a variety of inner apparatus, including the drive system for the control rods.
The utility earlier released still images of the inside of the containment vessel, which were captured by a camera attached to an approximately 13-meter-long pipe inserted into the vessel.
or see the video here : **http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=uikti9fd&catid=61785**

January 31, 2018

Cleaning up No.3 reactor

The final pieces of a jelly roll-shaped cover are being put in place atop the most damaged nuclear reactor, the No. 3 reactor of the Fukushima No. 1 nuclear power plant in Okuma, Fukushima Prefecture, on Jan. 25. (AP Photo)

Worst-hit reactor at Fukushima may be easiest to clean up

http://www.asahi.com/ajw/articles/AJ201801310050.html

THE ASSOCIATED PRESS

OKUMA, Fukushima Prefecture--High atop Fukushima's most damaged nuclear reactor, the final pieces of a jelly-roll shaped cover are being put in place to seal in highly radioactive dust.

Blown apart by a hydrogen explosion in 2011 after an earthquake and tsunami hit Japan's Fukushima No. 1 nuclear power plant, reactor No. 3 is undergoing painstaking construction ahead of a milestone that is the first step toward dismantling the plant.

The operating floor--from where new fuel rods used to be lowered into the core--has been rebuilt and if all goes as planned, huge cranes will begin removing 566 sets of still-radioactive fuel rods from a storage pool just below it later this year.

It has taken seven years just to get this far, but now the real work of cleaning up the Tokyo Electric Power Co. plant can begin.

"If you compare it with mountain climbing, we've only been preparing to climb. Now, we finally get to actually start climbing," said Daisuke Hirose, an official at the plant's decommissioning and decontamination unit.

Cleaning up the plant's three reactors that had at least partial meltdowns after the earthquake and tsunami is a monumental task expected to take three to four decades. Taking out the stored fuel rods is only a preliminary step and just removing the ones in No. 3 is expected to take a year.

Still ahead is the uncharted challenge of removing an estimated 800 tons of melted fuel and debris inside the cracked containment chambers--six times that of the 1979 Three Mile Island accident.

The area in and outside of No. 3 is part construction site and part disaster zone still requiring protection from radiation. A makeshift elevator, then a wind-swept outdoor staircase, takes visitors to the operating floor, more than 30 meters above ground.

Daylight streams in through the unfinished section of the new cover, a tunnel-like structure sealed at both ends to contain radiation. An overhead crane that moves on rails stands at the side of the storage pool, the maker's name, "Toshiba," emblazoned in large red letters.

The explosion left major chunks of debris that have been removed from the storage pool, a painstaking operation done using remote-controlled machinery and with utmost care to avoid damaging the fuel rods. Smaller rubble lines the pool's edge. The water's surface is obscured by a blue netting to prevent more debris from accidentally tumbling in.

The severe damage to No. 3 has, in the end, made it easier to clean up than the other two reactors.

Under the latest government roadmap approved last September, removal of the fuel rods from reactors 1 and 2 was delayed by three years until 2023, a second postponement from the original 2015, because further decontamination and additional safety measures are needed.

No. 1 fell behind because of a delay in removing debris and repairing key components on the operating floor. The No. 2 building remained intact, keeping high radiation and humidity inside, which makes it more difficult for workers to approach and decontaminate.

Radioactivity on the No. 3 operating floor has fallen to a level that allows workers in hazmat suits and filter-masks to stay up to two hours at a time, though most work still needs to be done remotely.

The segments of the new cover were pre-assembled and are being installed one by one by remote-controlled cranes. With two pieces left, the plant operator says the cover will be completed in February.

Removing the fuel rods in No. 3 will be done with a fuel-handling crane. It will move the rods out of their storage racks and pack them in a protective canister underwater. A second Toshiba crane, a 10-meter-high yellow structure across the operating floor, will lift the canister out of the pool and load it onto a vehicle for transport to another storage pool at the plant.

Crane operators and others assigned to the project, which requires caution and skill, have been rehearsing the procedures.

The 1,573 sets of fuel rods stored in spent fuel pools at the three reactors are considered among the highest risks in the event of another major earthquake. Loss of water from sloshing, structural damage or a power outage could cause meltdowns and massive radiation leaks because the pools are uncovered.
Hirose said that starting fuel removal at No. 3 would be "a major turning point."
Still, after the intact fuel rods are gone comes by far the most difficult part of decommissioning the plant: removing the melted fuel and debris from inside the reactors.
Obtaining exact locations and other details of the melted fuel are crucial to determining the retrieval methods and developing the right kind of technology and robots. With most melted fuel believed to have fallen to the bottom, experts are proposing that it be accessed from the side of the containment vessel, not from the top as originally had been planned, based on the cleanup after an accident at the Three Mile Island nuclear plant in the United States.
Computer simulations and limited internal probes have shown that the melted fuel presumably poured out of the core, falling to the bottom of the primary containment vessels. Robotic probes at the No. 3 and 2 reactors have captured images of large amounts of melted fuel, but attempts so far at No. 1 have been unsuccessful.
Despite scarce data from inside the reactors, the roadmap says the methods for melted fuel removal are to be finalized in 2019, with actual retrieval at one of the three reactors in 2021. Hirose says it is premature to say whether No. 3 will be the first.

February 1, 2018

Radiation still major challenge

Lethal radiation detected at Fukushima plant

https://www3.nhk.or.jp/nhkworld/en/news/20180201_40/

The operator of the crippled Fukushima Daiichi nuclear power plant has released the results of its latest probe of the site.

A remote-controlled inspection of the Unit 2 reactor containment vessel last month detected a maximum of 8 sieverts per hour of radiation.

Experts say exposure to such radiation for about an hour would be fatal.

Officials from Tokyo Electric Power Company, or TEPCO, released the results on Thursday.

They said the radiation reading was taken near what appeared to be fuel debris, the term used to describe a mixture of molten fuel and broken interior parts.

The finding shows that nearly 7 years after the meltdowns, radiation levels remain so high that they present a major challenge to decommissioning work.

During the probe, 42 sieverts per hour of radiation was also detected outside the foundations of the reactor.

But officials said they have doubts about the accuracy of the reading because a cover had not been removed from the measuring instrument at the time.

They added that they don't know why radiation levels were lower near the suspected fuel debris than around the foundations.

They gave a number of possible reasons, such as that cooling water may have washed radioactive materials off the debris.

TEPCO's Chief Decommissioning Officer, Naohiro Masuda, says the company will develop debris-removal technology based on the outcome of the investigation.

February 8, 2018

New on-site storage facility for radioactive rubble

Rubble storage at Fukushima plant shown to media

https://www3.nhk.or.jp/nhkworld/en/news/20180208_32/

The operator of the Fukushima Daiichi nuclear plant has completed a facility to store radioactive rubble from the March 2011 accident.

Tokyo Electric Power Company showed the new storage facility in the compound to the media on Thursday.

The Number 1 to Number 3 reactors suffered meltdowns and the reactor buildings were badly damaged after a quake-triggered tsunami hit the plant on March 11th, 2011.

As part of decommissioning work, rubble scattered after the accident needs to be cleared before spent nuclear fuel can be removed from storage pools in the upper parts of the reactor buildings.

At the Number 1 reactor building, work to clear more than 1,500 tons of rubble began in January. Its pool stores 392 fuel units.

The newly-completed facility is capable of storing more than 60,000 cubic meters of rubble.

Officials say a special vehicle that blocks radiation will take rubble from the Number 1 reactor building to the storage facility, and remote-controlled forklifts will be used to carry the rubble inside it.

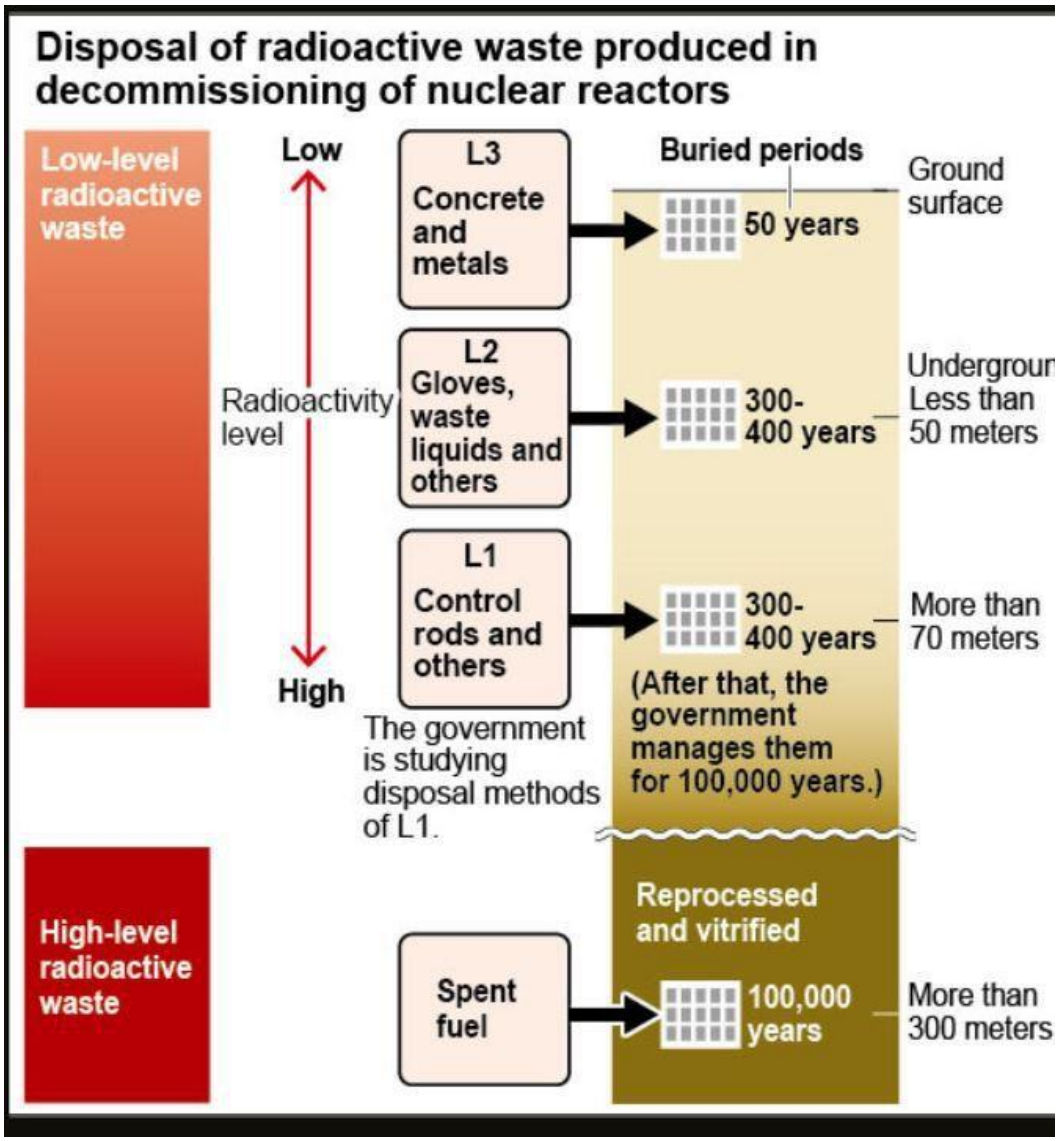
The storage facility is 2 stories above ground and 2 below. The more radioactive the debris, the deeper underground it will be stored.

Officials say **the facility can block radiation of levels up to 10 sieverts per hour, as it is covered by concrete walls up to 65 centimeters thick.**

Kazuteru Ofuchi, a TEPCO official in charge of waste disposal, says the firm will make sure to minimize workers' exposure to radiation, by working remotely.

February 16, 2018

No utility has any idea how to safely dispose of low-level waste



By TSUNEO SASAI/ Staff Writer (Asahi Shimbun)

Seven electric power companies that plan to decommission nuclear reactors have yet to secure disposal sites for the low-level radioactive waste produced in the dismantling process, an Asahi Shimbun survey showed on Feb. 16.

It may take years for the utilities to gain approval from local governments to dispose of the waste, some of which must remain buried for 100,000 years, meaning that the decommissioning work could be suspended.

Low-level radioactive waste generated during conventional operations of nuclear reactors can be buried at a disposal site of Japan Nuclear Fuel Ltd. in Rokkasho, Aomori Prefecture.

However, the electric power companies themselves must dispose of the low-level radioactive waste produced during decommissioning work.

The Asahi Shimbun asked 10 electric power companies, including Japan Atomic Power Co., about whether they have secured disposal sites for low-level radioactive waste.
Seven companies--Tokyo Electric Power Co., Chubu Electric Power Co., Kansai Electric Power Co., Chugoku Electric Power Co., Shikoku Electric Power Co., Kyushu Electric Power Co. and Japan Atomic Power--replied that they have not secured sites despite their plans to decommission reactors.
In total, they plan to decommission 17 reactors.
The demolition of a 1.1 gigawatt-class nuclear reactor produces more than 10,000 tons of low-level radioactive waste.
The three other companies--Hokkaido Electric Power Co., Tohoku Electric Power Co. and Hokuriku Electric Power Co.--also have not secured disposal sites, but they have no decommissioning plans at the moment.
“We are not considering decommissioning our nuclear reactors,” a Hokuriku Electric Power official said. “As of now, we have not yet decided on a plan to secure disposal sites.”
There are three categories of nuclear waste--L1, L2 and L3--depending on their radioactivity levels.
L1 waste, which has the highest radioactivity level and includes control rods, must be buried more than 70 meters deep into the ground for 300 to 400 years.
After that, the government manages the waste for 100,000 years.
The government is currently studying regulation standards for such waste.
Electric power companies decided to decommission some of their nuclear reactors after the March 2011 disaster unfolded at the Fukushima No. 1 nuclear power plant.
Full-fledged decommissioning work is expected to start soon, but parts removed from the reactors have high radiation levels and cannot be placed temporarily in the compounds of nuclear power plants.
High-level radioactive waste is also produced as a result of the reprocessing of spent nuclear fuel. The government is looking for a disposal site for such waste.
Electric power companies could heighten their demands that the government get involved in efforts to secure disposal sites for low-level radioactive waste.

February 21, 2018

No.3 reactor gets new roof

The final pieces of a jelly roll-shaped cover are being put in place atop the most damaged nuclear reactor, the No. 3 reactor of the Fukushima No. 1 nuclear power plant in Okuma, Fukushima Prefecture, on Jan. 25. (AP Photo)

The final part of a roof is put in place on the top of the No. 3 reactor building at the Fukushima No. 1 nuclear power plant on Feb. 21. (Naoko Kawamura)

Roof completed for removal of spent fuel rods at Fukushima plant

http://www.asahi.com/ajw/articles/photo/AS20180221002728.html

By HIROSHI ISHIZUKA/ Staff Writer

Work was completed Feb. 21 on a half-cylinder roof designed to trap radioactive substances emitted when spent fuel rods are removed from the No. 3 reactor building at the Fukushima No. 1 nuclear plant.
Tokyo Electric Power Co., the plant's operator, plans to remove the spent fuel from the building's storage pool as early as this autumn.
Construction work on the roof--23 meters wide and 57 meters long--started in July 2017.
The final piece, weighing about 55 tons, was lifted by a crane and put into place on Feb. 21. The roof is located directly above the storage pool.
A hydrogen explosion severely damaged the original roof of the No. 3 reactor building days after the March 2011 Great East Japan Earthquake and tsunami triggered the meltdowns at the plant.
The 566 fuel assemblies in the storage pool pose a serious risk in the event of another disaster striking the plant.
Completion of the roof should advance TEPCO's plans to remove the fuel rods as soon as possible.

Fukushima plant reactor gets new roof cover

https://www3.nhk.or.jp/nhkworld/en/news/20180221_19/

Workers at the crippled Fukushima Daiichi nuclear power plant have finished installing a new roof covering for the No.3 reactor building.

The work started last August to set up a dome-shaped cover. It is part of preparations for removing nuclear fuel from the reactor's storage pool. A total of 566 spent and unused fuel units remain in the storage pool of the No. 3 reactor.

On Wednesday, workers installed the last part of the cover, which is 17 meters high and 22 meters wide, and weighs 55 tons.

The cover will prevent radioactive materials from spreading, and shield the building from winds.

Reactors at the Fukushima plant suffered meltdowns after a quake-triggered tsunami hit the plant on March 11th, 2011. The fuel units left in storage pools need to be removed as part of decommission work at the plant.

The plant's operator, Tokyo Electric Power Company, will clear the pool of rubble and provide workers with training on remotely handling devices for the fuel removal.

Then, it plans to start removing nuclear fuel units from the No.3 reactor's storage pool in autumn this year, ahead of those of other damaged reactors.

February 26, 2018

Fugen reactor: Spent fuel removal delayed 9 years

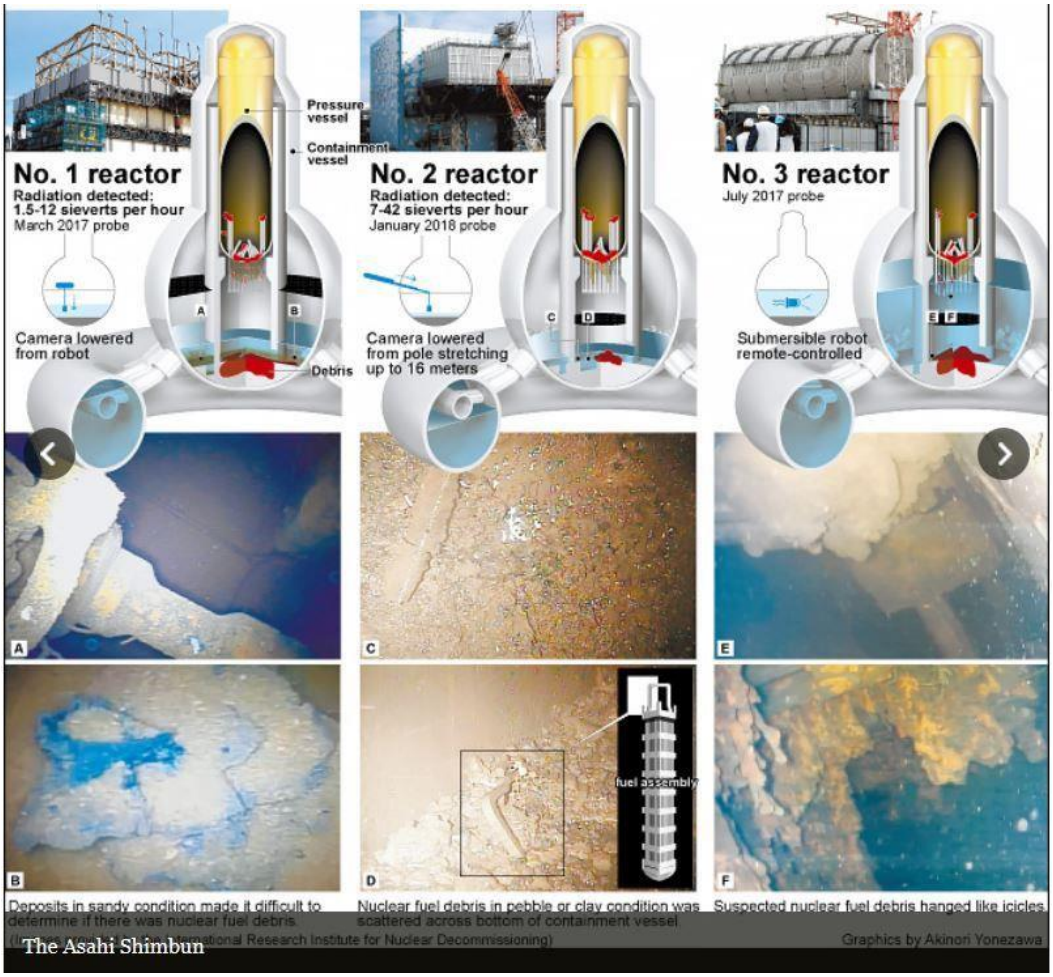
Removal of spent fuel from Fugen reactor site pushed back 9 years

https://mainichi.jp/english/articles/20180226/p2g/00m/0dm/071000c

FUKUI, Japan (Kyodo) -- The transportation of spent nuclear fuel from the site of the Fugen prototype advanced converter reactor in central Japan will be postponed by nine years to fiscal 2026 as a reprocessing facility has yet to be determined, its operator said Monday.
Japan Atomic Energy Agency President Toshio Kodama announced the delay in a meeting with Fukui Gov. Issei Nishikawa. The state-backed agency had initially aimed to complete transportation of the fuel from the reactor in Tsuruga, Fukui Prefecture, by next month.
It was originally planned that the reprocessing facility in Tokaimura, Ibaraki Prefecture, would receive the fuel, but the agency decided in 2014 to scrap the plant due to the difficulty of satisfying tighter safety regulations adopted following the 2011 Fukushima nuclear crisis.
The agency had been looking to transport the fuel overseas for reprocessing but discussions have not gone smoothly, sources close to the matter said.
The Fugen reactor is currently undergoing decommissioning after being shut down in March 2003 without the prospect of being put to commercial use, as a project to build a next-stage experimental reactor was scrapped due to its high cost. Operation of the reactor started in 1979.
Of the 738 fuel assemblies stored at the reactor site, 272 had been transported to the reprocessing facility in Tokaimura by 2007, but the process to transport the remainder has been suspended since work to boost the quake resistance of the reprocessing facility was launched in 2008.
The agency is set to ask the Nuclear Regulation Authority soon for approval to change in its decommissioning program, reflecting the delay in the time frame for the removal of the spent fuel. The agency will retain its plan to complete the decommissioning of the reactor in fiscal 2033.

March 7, 2018

Hard road ahead



SEVEN YEARS AFTER: Robotic probes of Fukushima reactors show tough task ahead

http://www.asahi.com/ajw/articles/AJ201803070054.html

Locating all the nuclear fuel debris and ascertaining the precise chain of events that led to the triple meltdown at the Fukushima No. 1 nuclear power plant was never going to be easy.

And just what a hard road lies ahead is becoming more apparent as plant operator Tokyo Electric Power Co. prepares for the day when decommissioning will start.

Over the past year, TEPCO has used remote-controlled robots to investigate the facility's wrecked interior. But the images sent back offer only a partial picture of the melted nuclear fuel and numerous obstacles to be overcome.

Of the three meltdowns in 2011, the one in the No. 1 reactor was the most severe, according to TEPCO. It said almost all of the nuclear fuel in the No. 1 reactor likely melted through the bottom of its pressure vessel.

Images sent by a robotic probe in March 2017 showed numerous deposits in sandy condition submerged in water at the base of the reactor’s containment vessel. But no nuclear fuel debris that may lie below was visible.

More progress was made during investigations into the No. 2 reactor over the past year.

In January 2017, a remote-controlled camera hanging from a pole snapped images of dark chunks scattered in the area beneath the reactor’s pressure vessel.

It was the first confirmation of conditions in that area of any of the three reactors. Gaping holes were seen in a platform used by plant workers. The following month, a robotic probe called Scorpion was deployed, but it got stuck and was unable to transmit data.
A further probe by a remote-controlled camera in January turned up images of a nuclear fuel assembly handle near the bottom of the containment vessel. Given that fuel assemblies are about 4 meters long and the handle is mounted on the top, TEPCO said most of the nuclear fuel assemblies must have melted through the pressure vessel to land at the bottom of the containment vessel. Pebbly deposits strewn around the handle are believed to be the nuclear fuel debris, officials said.
An underwater robot used to explore the No. 3 reactor in July showed that the unit lies submerged in more water than the No. 1 and No. 2 reactors.
Images taken by the robot showed clusters of brown icicles hanging from a structure at a lower part of the pressure vessel. Similar icicles that resembled melted rocks could also be seen below.
TEPCO said this is the first time for nuclear fuel debris to be confirmed at the plant.
The government and TEPCO have set a goal of starting a test project in 2021 to retrieve nuclear fuel debris at one of the reactors.
But sticking to that plan is proving to be increasingly difficult. The robotic probes drove home the extent of damage inside the reactors. It is more serious than initially thought.
The probes also revealed a puzzling situation about the No. 2 reactor: Radiation levels at a site away from deposits of nuclear fuel debris are higher than those at a site close to them.
The government and the utility have yet to figure out how to remove the debris while keeping workers safe from radiation exposure when full-scale decommissioning starts. Also not decided is where to store the debris.
Fukushima prefectural authorities insist that the debris and other waste from the plant should be permanently stored outside of the prefecture.
But there has been no discussion to date on how to find municipalities that may agree to take the waste.
(This article was written by Chikako Kawahara and Yusuke Ogawa.)

March 8, 2018

Long Road Ahead for Fukushima Nuclear Plant Decommissioning

https://www3.nhk.or.jp/nhkworld/nhknewsline/backstories/longroadaheadfor/

Sunday marks 7 years since the earthquake and tsunami caused massive devastation in northeastern Japan, and triggered a nuclear disaster. More than 18,000 people died or are still missing, and over 3,600 have died from disaster-related causes.
After the worst nuclear accident in Japan's history, workers at the Fukushima Daiichi nuclear power plant are still battling radiation and contaminated water in the decommissioning process. They've made progress, but there is still a long way to go.
The plant's 3 reactors suffered meltdowns following the earthquake and tsunami. It's believed nuclear fuel rods melted and fell to the bottom of containment vessels. Removing that fuel debris remains the most difficult part of decommissioning.
Engineers have found what appears to be fuel debris in 2 of the reactors using robots and cameras. But figuring out how much there is and how to remove it remain big questions. Still, Japan's government and the operator Tokyo Electric Power Company say they want to begin removing the debris from one of the reactors in about 3 years.
Radiation levels are so high near the reactors that workers can't spend much time there. But outside the buildings, levels have gone down through decontamination measures.

Another big problem is contaminated water. Groundwater continues to seep into the reactor buildings, getting contaminated. Although it is processed and stored, there's still no decision on what to do with more than 800 tanks.
The operator has built an underground wall of frozen soil to prevent some groundwater from getting in the buildings. TEPCO says it is not the only answer and is also trying other methods. The decommissioning process is expected to take decades, with the government estimating it will cost more than US$70 billion. Adding in costs for the broader
decontamination of surrounding areas and compensation for affected residents, the bill could reach about US$200 billion.

March 11, 2018

Decommissioning progress

Decommissioning Fukushima reactors will take time but progress continues

https://mainichi.jp/english/articles/20180310/p2a/00m/0na/018000c#cxrecs_s

In this July 27, 2017 file photo, contaminated water storage tanks are seen on the Fukushima No. 1 nuclear plant grounds, in Okuma, Fukushima Prefecture. (Mainichi)
Over the past year, clumps appearing to be melted fuel debris have been found inside three reactors at Tokyo Electric Power Co. (TEPCO)'s Fukushima No. 1 Nuclear Power Plant -- which will soon mark seven years since being struck by disaster, on March 11.

- 【Related】TEPCO unveils footage of deposits inside Fukushima reactor
- 【Related】TEPCO estimates 'ice wall' reduces contaminated water by 95 metric tons per day

However, the specific properties of the fuel debris remain unclear, and the decision on how to go about extracting the material has been delayed. The mammoth task of decommissioning the nuclear power plant, which is expected to take 40 years, is moving at a sluggish pace.
Removing the debris is the most difficult part of the decommissioning process. During an internal probe of nuclear containment vessels at the site, which involved robots, debris-like clumps were discovered in the No. 2 and No. 3 reactors, and sand-like sediment was found spread across the bottom of the No. 1 reactor. However, the specific properties and distribution of the debris has not yet been ascertained.
In September 2017, the government and TEPCO re-examined its decommissioning operation schedule. Initially, it was planned that the reactor which would undergo decommissioning first, as well as the method, would be decided by the end of the first half of fiscal 2018. However, the decision was delayed until the end of fiscal 2019 due to a lack of information concerning the situation inside the reactors, as well as the debris.
Meanwhile, as part of countermeasures against contaminated water, an ice wall designed to block the flow of underground water has almost been completed. In addition, a sub-drain well that pumps away subterranean water has been reinforced. As a result, the volume of underground water flowing into the buildings housing the reactors has been reduced from roughly 400 metric tons per day, which was the figure immediately after the outbreak of the disaster, to about 80 tons per day -- indicating that there has been some progress regarding the "entrance" policy designed to reduce the volume of contaminated water generated at the site.
However, the "exit" policy, designed to dispose of treated water after most of the radioactive materials have been removed from the contaminated water, is still up in the air. The major issue concerning this

policy is that the radioactive material tritium (tritiated hydrogen) cannot be removed, in principle, from treated water.
Tritium is something that appears in the natural world. Based on the fact that it has been flowing out into the sea from nuclear facilities across the globe, the Nuclear Regulation Authority stresses that Fukushima's treated water containing tritium should be diluted and flushed out into the sea. However, due to fears that this could damage the reputation of the local fishing industry, the government and TEPCO continue to keep the treated water stored in tanks.
As a result, the amount of radioactive water stored at the site, including the treated water, has risen to about 1.05 million tons, and the number of tanks has increased to roughly 850. The government has set up a committee looking into how to dispose of the treated water, but consensus has not yet been reached.
Meanwhile, with regard to the extraction of fuel from pools of spent nuclear fuel, removal is planned from the No. 1 and No. 2 reactors in fiscal 2023, three years later than initially scheduled, and from the No. 3 reactor sometime around mid-FY2018. Special cranes are being installed to prepare for the job.

March 14, 2018

"A semblance of order has been restored"

EDITORIAL: TEPCO's priority is, and will be, to decommission crippled reactors

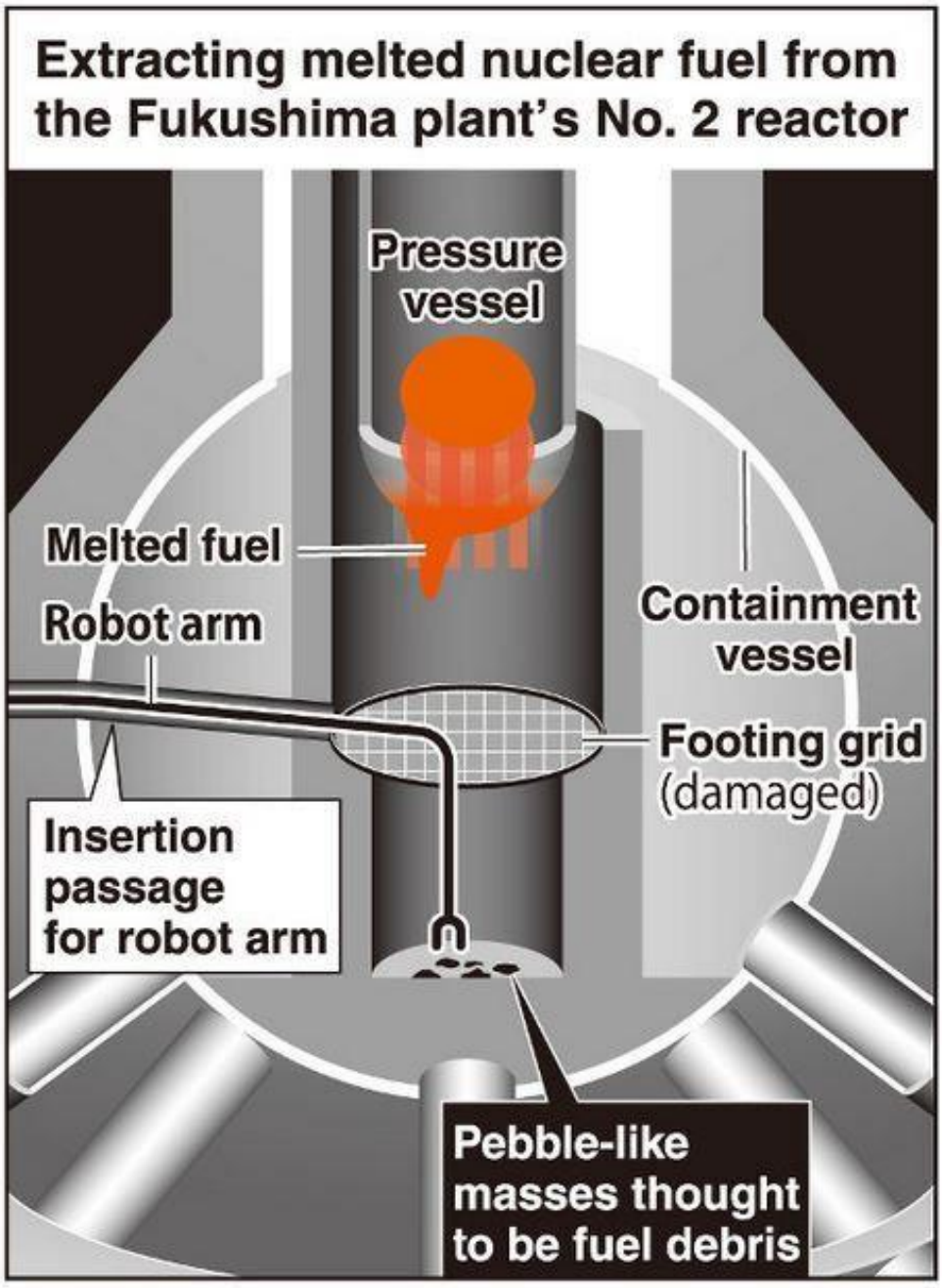
http://www.asahi.com/ajw/articles/AJ201803140016.html

Toyoshi Fuketa, chairman of the Nuclear Regulation Authority (NRA), told a news conference last week that the Fukushima nuclear accident is far from over, and that it would be a mistake to think of it solely as something that occurred seven years ago.
On the surface, it appears as if a semblance of order has been restored at the Fukushima No. 1 nuclear power plant, the site of one of the most catastrophic nuclear accidents in history.
Except for in and around the crippled reactor buildings, workers can now go almost anywhere on the premises without protective clothing.
Measures have been set in place to cool debris from the reactor cores and spent nuclear fuel in storage pools.
The NRA has considerably downgraded the risk of the plant spewing massive amounts of radioactive substances again.
In reality, however, the road to reactor decommissioning is long and arduous.
"We are still in no state to see the peak of the mountain," Fuketa said. "We don't even know what sort of uphill slope awaits us."
The government last year revised its timetable for reactor decommissioning. The basic target of "decommissioning in 30 to 40 years" has not changed, but the removal of spent fuel from the No. 1 and No. 2 reactor pools will not begin until fiscal 2023, three years later than initially projected.
With the state of the immediate surroundings of the reactor cores still being understood only vaguely, any decision on concrete steps for the removal of debris has been postponed by one year to fiscal 2019.
The volume of water containing radioactive substances, stored in 850 tanks, has reached 1 million tons, and it will only keep growing with the passage of time. The bloating costs of reactor decommissioning will translate into a heavier taxpayer burden. But trying to rush the job will raise the risk of exposing workers to radiation and inviting accidents.
Tokyo Electric Power Co. (TEPCO), the operator of the Fukushima No. 1 plant, started last summer to publicly announce troubles encountered by cleanup crews as "deviations from the norm."

Such issues include injuries or acute illnesses suffered by workers, vehicular collisions while multiple operations are being simultaneously run, and the deterioration of machinery used in emergencies. While most of these cases do not constitute legal violations, they are being reported almost daily.
Ensuring the safety of workers is TEPCO's top priority. The utility must also pay close attention to other factors while proceeding steadily with reactor decommissioning, such as reducing the risks of environmental pollution. It is also crucial for the company to explain the situation to local residents as well as the general public and heed their voices.
However, some within the NRA, as well as the Nuclear Reform Monitoring Committee, a group of domestic and overseas experts who advise TEPCO's board of directors, have frequently expressed concern that TEPCO may start prioritizing its corporate profitability.
For TEPCO, which has been bailed out effectively under government control, decommissioning the reactors at the Fukushima No. 1 plant should be its foremost task. As the very party that allowed the nuclear disaster to occur, it is obviously its responsibility to invest sufficient capital and manpower in this undertaking.
In 2013, when Tokyo was bidding for the 2020 Olympics, Prime Minister Shinzo Abe declared in his speech that the issue of contaminated water at the Fukushima plant was "under control."
But such optimism was hardly warranted, given the difficulty that became clear in disposing of the radioactive water.
This must be firmly borne in mind by TEPCO, as well as the Ministry of Economy, Trade and Industry, which oversees the utility, and the NRA.

March 16, 2018

Test sampling of fuel debris from No.2 reactor to be done in FY 2019



First samples of Fukushima plant nuclear fuel debris to be collected in FY 2019

https://mainichi.jp/english/articles/20180316/p2a/00m/0na/018000c

The government and Tokyo Electric Power Co. (TEPCO) are set to extract a small sample of melted nuclear fuel from the bottom of the No. 2 reactor's containment vessel at the disaster-stricken Fukushima No. 1 nuclear plant as early as fiscal 2019.

- 【Related】Decommissioning Fukushima reactors will take time but progress continues
- 【Related】TEPCO unveils footage of deposits inside Fukushima reactor
- 【Related】TEPCO unveils results of underwater footage taken inside Fukushima plant

The operation will be a test before starting full-scale collection of the fuel, targeted for 2021 or earlier. If development of technologies for debris retrieval shows promise, the operation may be moved up to the end of fiscal 2018. The government and TEPCO hope to ascertain the properties of the melted fuel and use the information for developing collection devices and debris containers.
This will be the first attempt to sample nuclear fuel debris from a reactor. Other materials, including those floating in contaminated water and substances stuck to robot probes, have been extracted from the plant's reactors before. The No. 1, 2 and 3 reactors at the Fukushima No. 1 plant melted down in the March 2011 nuclear disaster.
The road map for collecting the melted fuel, last revised in September 2017, states that TEPCO would choose a first reactor to tackle by the end of fiscal 2019 and decide on a collection method. The utility would then start the retrieval process in 2021. As deciding on this process requires finalizing ways to contain, transfer and store the debris, the government and utility concluded that they would need to grasp the fuel's current condition by extracting samples beforehand.
In January this year, a camera and dosimeter were sent into the containment vessel of the No. 2 reactor through an existing passage to find pebble- and clay-like masses at its bottom believed to be melted fuel. A source close to the government says the plan is to remotely guide a robot arm equipped with a camera and dosimeter into the containment vessel through the same passage, and extract a small amount of the suspected fuel debris.
The January probe of the containment vessel revealed radiation around the pebble-like masses measured 8 sieverts per hour -- a level potentially lethal to humans after just one hour of exposure. Due to the ultrahigh radiation, the sampled material will be placed in a special radiation-shielded container before being removed from the reactor. After that, the sample will be brought to a Japan Atomic Energy Agency facility in Ibaraki Prefecture for analysis.
A government source told the Mainichi Shimbun that sampling the suspected fuel debris is different from the debris collection specified in the road map, and stressed that extracting samples should be beneficial to determine a method for retrieving the fuel.

March 27, 2018

Ikata No.2 to be decommissioned

Ikata No.2 reactor to be decommissioned

https://www3.nhk.or.jp/nhkworld/en/news/20180327_17/

The No.2 reactor at the Ikata nuclear plant in Ehime Prefecture, western Japan, is to be decommissioned.

Board members of Shikoku Electric Power Company made the decision on Tuesday. The reactor went into operation 36 years ago.

Government guidelines introduced after the 2011 Fukushima nuclear accident limit the operation of reactors to 40 years in principle, but allow for extensions of up to 20 years.

Shikoku Electric decided not to apply for the extension. It said the massive cost of new safety measures required for a restart does not make financial sense.

The utility has already decided to scrap the plant's No.1 reactor. The No.3 reactor was restarted in 2016. But a high court issued an injunction to halt it last December.

The Ikata No.2 reactor is the 9th in Japan now slated for decommission, excluding those at the Fukushima Daiichi power plant.

Western Japan nuclear reactor to be scrapped

https://www3.nhk.or.jp/nhkworld/en/news/20180327_01/

A power company in western Japan has decided to decommission an aging nuclear reactor.

The No. 2 reactor at the Ikata plant in Ehime Prefecture has been in operation for 36 years.

Government guidelines introduced after the 2011 Fukushima Daiichi nuclear accident limit the operation of reactors to 40 years in principle.

Shikoku Electric Power Company decided not to apply to extend the reactor's operation for another 20 years, citing the cost of required additional safety measures.

It will inform local authorities of the decision on Tuesday.

The utility has already decided to decommission the plant's No. 1 reactor. And a high court ordered the company to stop operations at the No. 3 reactor last December. The court decision came after the reactor was restarted in 2016.

The No. 2 reactor is the 9th in Japan authorized for decommissioning in the aftermath of the 2011 accident, excluding those at the crippled Fukushima Daiichi plant.

March 28, 2018

NRA approves end of Monju

Japan Regulator Approves Monju Decommissioning Plan, Say Reports

https://www.nucnet.org/all-the-news/2018/03/28/japan-regulator-approves-monju-decommissioning-plan-say-reports

Japan's Nuclear Regulation Authority (NRA) has approved a 30-year plan to decommission the prototype Monju fast breeder reactor in Fukui Prefecture, southwest Japan, reports in local media said. The Japan Atomic Energy Agency (JAEA), Monju's operator, filed a decommissioning application with the NRA in December 2017, while a basic decommissioning plan was approved by a Japanese government commission in June 2017.

According to the Japanese daily Mainichi, the approved plan calls for dismantling the reactor in four phases, beginning with the removal of 530 spent fuel rods from the reactor core between fiscal 2018 and fiscal 2022 and ending with the demolition of the reactor building by fiscal 2047.

However, Mainichi said the plan does not define how 760 tonnes of radioactive sodium coolant will be extracted from Monju and what the final destination for the spent fuel will be.

Tokyo-based industry group Japan Atomic Industrial Forum said last year that the government has not yet specified any destination for the spent fuel. Jaif said officials will work out details of a transportation plan before the fuel is completely removed from the reactor.

Monju is a 246-MW sodium-cooled fast reactor designed to use mixed fuel rods of uranium and plutonium and to produce more fissile material than it consumes. Monju reached criticality for the first time in 1994, but it has mostly been offline since 1995 when 640 kg of liquid sodium leaked from a cooling system, causing a fire.

Monju was allowed to restart in May 2010 after JAEA carried out a review of the plant's design, and its safety procedures, which were shown to be inadequate. However, operation was again suspended in August 2010 after a fuel handling machine was dropped into the reactor during a refuelling outage. Japan's government decided to permanently shut down the reactor in 2016.

Decommissioning and dismantling costs are estimated at $3.2bn.

June 13, 2018

Scrapping the Tokai plant over 70 years at taxpayers' expense

Japan approves 70-year plan to scrap nuclear reprocessing plant

https://www.japantimes.co.jp/news/2018/06/13/national/japan-approves-70-year-plan-scrap-nuclear-reprocessing-plant/#.WyEjP4oyWos

Kyodo
Japan's nuclear watchdog approved a plan Wednesday to scrap a nuclear fuel reprocessing plant northeast of Tokyo over a 70-year period, with the cost projected at ¥1 trillion ($9 billion).
The facility in the village of Tokai, Ibaraki Prefecture, went into operation in 1977. It was Japan's first spent-fuel reprocessing plant built under the nation's nuclear fuel cycle policy, which aims to reprocess all spent nuclear fuel in order to reuse the extracted plutonium and uranium as reactor fuel in the resource-scarce country.
But the policy has run into a dead end as the completion of a separate fuel reprocessing plant in Aomori Prefecture, built using technological expertise developed through the Tokai plant, has been delayed by more than 20 years.
The decommissioning cost will be shouldered by taxpayers as the Japan Atomic Energy Agency, which operates the Tokai plant, is backed by the state. Where to store the waste accumulated at the plant is undecided. In 2014, the agency decided to decommission the plant due to its age and the huge costs of running it under stricter safety rules introduced after the 2011 Fukushima nuclear crisis.
According to the plan approved by the Nuclear Regulation Authority, around 310 canisters of highly radioactive, vitrified waste and some 360 cubic meters of radioactive water are currently stored at the facility.
Spending of about ¥770 billion has been estimated for the disposal of such waste and decommissioning of the facility, and roughly ¥217 billion for the 10-year preparation work.
The Tokai facility, which reprocessed a total of 1,140 tons of spent nuclear fuel, has been monitored by the International Atomic Energy Agency, as the extracted plutonium could be repurposed for other uses.

Due to the scrapping of the Tokai plant, the agency has delayed transportation of spent nuclear fuel from its Fugen prototype advanced converter reactor in Tsuruga, Fukui Prefecture, by nine years, to fiscal 2026.
The Tokai facility received some of the fuel from the Fugen reactor, which operated between 1979 and 2003, but destinations for the remaining fuel have yet to be decided. The agency has been looking to transport it overseas.
Japan's nuclear fuel recycling efforts have not paid off, with the troubled Monju prototype fast-breeder nuclear reactor set to be decommissioned over the next 30 years. The reactor in Fukui has barely operated over the past two decades despite the state investing ¥1 trillion.

June 14, 2018

Fukushima No.2 to be scrapped

Other Fukushima Nuclear Plant to be Scrapped

https://www3.nhk.or.jp/nhkworld/nhknewsline/backstories/otherfukushima/

Tokyo Electric Power Company has officially announced that it will scrap the Fukushima Daini nuclear plant. The plant is one of two in the prefecture. The other is the Daiichi plant that was crippled in the March 2011 earthquake and tsunami.
The plant is located about 12 kilometers south of Fukushima Daiichi. The plan marks a major turning point for the utility.
TEPCO President Tomoaki Kobayakawa visited Fukushima Governor Masao Uchibori on June 14th.
The governor says it's the residents' strong wish to have all nuclear reactors in the prefecture scrapped.
Kobayakawa says his company intends to start making specific plans to that end, and is planning to decommission all reactors at the Fukushima Daini plant.

June 15, 2018

TEPCO must fulfill its responsibility to society

EDITORIAL: TEPCO needs to scrap Fukushima No. 2 as part of a new mission

http://www.asahi.com/ajw/articles/AJ201806150026.html

Tokyo Electric Power Co. announced June 14 that it will move to decommission the currently offline Fukushima No. 2 nuclear power plant, located near the crippled Fukushima No. 1 plant.
Since the catastrophic accident seven years ago, the local governments and assemblies have been making repeated calls on the utility to decommission the facility, along with the stricken plant.
This is the company's belated move to respond to the calls by making a decision that has long been clearly inevitable.
TEPCO's equivocal attitude toward the issue, which left the situation ambiguous for far too long, has seriously hampered efforts to rebuild disaster-hit communities. The company should carry through this complicated and costly mission of dealing with another burdensome legacy of the Fukushima

disaster with a renewed and keen awareness of its responsibility for the immeasurable damage the accident has caused.
First of all, TEPCO needs to make the formal decision to decommission the reactors at the plant and quickly work out specific action plans and timetables for the project.
What is crucial is securing safety. TEPCO will have to decommission reactors at two plants simultaneously. Fukushima No. 2 was spared a serious accident as the plant was shut down properly in the 2011 earthquake-tsunami disaster.
Even decommissioning an ordinary, functioning reactor is a treacherous business that involves the tricky task of dealing with a huge amount of radioactive waste.
At the Fukushima No. 1 plant, where the process to decommission the reactors has already started, the project is facing formidable challenges since it is still impossible to grasp the accurate situation within the reactors that have suffered meltdowns.
Many local residents are deeply concerned about whether the decades-long process of decommissioning the reactors can be safely executed.
TEPCO must make every possible effort to ensure that the work will be done safely.
Residents of areas around the Fukushima No. 1 plant were forced to live away from their homes as evacuees for long periods.
There are still many areas where the total destruction of infrastructure has made it almost impossible for local residents to return home.
TEPCO should also make an active contribution to rebuilding such areas by, for example, employing workers for its decommissioning projects and cooperating with the renewable energy projects the Fukushima prefectural government is promoting.
The dismantling of the Fukushima No. 2 plant will remove from service all the 10 reactors that used to operate in the prefecture before the disaster and leave the Tokyo-based electric utility with less than half the reactors it once had.
This prospect should prompt TEPCO to rethink its management strategy, which has been heavily dependent on nuclear power generation.
The utility, which is now effectively under state control, is under strong pressure to sharply increase its profits to cover the huge costs of dealing with the consequences of the accident.
To lift its bottom line, the firm is seeking to restart reactor operations at its Kashiwazaki-Kariwa nuclear power plant in Niigata Prefecture and complete the ongoing construction of a new nuclear plant in Higashidori, Aomori Prefecture. But the outlook of both projects remains uncertain.
Since the Fukushima nuclear disaster, the Japanese public has become markedly wary of nuclear power generation in general. To make matters worse for TEPCO, the costs of required safety measures have surged.
The utility should ask itself whether it would really be proper to continue devoting massive management resources to nuclear power generation.
Outside Japan, many energy companies are racing to make investments and conduct research and development projects in new business areas, particularly those related to renewable energy. Because of declining costs and a spurt of technological innovation, renewable power generation is widely seen as a new, promising growth area.
As a special business entity that has been kept alive with taxpayer money since the devastating accident, TEPCO should think afresh what is the best way to fulfill its responsibilities to society.

Editorial: TEPCO should quickly decommission Fukushima No. 2 nuclear plant

https://mainichi.jp/english/articles/20180615/p2a/00m/0na/026000c

Tokyo Electric Power Co. (TEPCO) has finally announced that it will decommission its Fukushima No. 2 Nuclear Power Plant, more than seven years after the outbreak of the ongoing crisis at its tsunami-

ravaged Fukushima No. 1 plant. If realized, all 10 nuclear reactors in Fukushima Prefecture would be dismantled.

- 【Related】TEPCO staffer testifies execs put off tsunami measures at Fukushima plant
- 【Related】TEPCO refused in 2002 to calculate possible tsunami hitting Fukushima: ex-gov't official
- 【Fukushima & Nuclear Power】

The presence of the No. 2 power station has offended Fukushima Prefecture residents, many of whom are still living as evacuees, and others who have suffered groundless rumors about radiation contamination. TEPCO needs to swiftly draw up a road map that will enable smooth decommissioning of the complex.

Like the No. 1 plant, the No. 2 complex was also hit by tsunami generated by the March 2011 Great East Japan Earthquake. However, some of its external power sources remained intact, averting meltdowns at the plant.

The No. 2 plant remains offline, but a massive amount of nuclear fuel remains in the complex. Since prefectural residents have deeply rooted concerns about the plant's safety and its possible reactivation in the future, the prefectural government has urged TEPCO and the national government, which effectively has the largest stake in the utility, to decommission the plant at an early date.

Reactivation of a nuclear plant requires consent from the local municipalities hosting the complex. Therefore, the resumption of operations at the No. 2 power station has always been a politically unfeasible option.

Moreover, more than 30 years have passed since operation of its four reactors began.

To operate the reactors beyond the 40-year limit set under new rules introduced after the outbreak of the nuclear crisis, it is necessary to invest a vast amount of money for additional safety measures. That means there were no merits to keeping the power station open in terms of the utility's finances.

Nevertheless, TEPCO had delayed the decision to decommission the complex.

Once a utility decides to decommission a nuclear reactor, the operator cannot regard the facility or the nuclear fuel inside it as part of the company's assets, weakening its financial base. It appears TEPCO may have waited to make the decision until the company had restored its financial strength.

However, even considering the financial strain that TEPCO experienced after the March 2011 disaster, it deserves criticism for its lack of sincerity, failing to provide a sufficient explanation to the public about its plans for the reactors.

TEPCO President Tomoaki Kobayakawa, who notified Fukushima Gov. Masao Uchibori of the decision, has admitted that the No. 2 plant "has hindered disaster recovery." If so, the utility should promptly begin preparations to decommission the complex.

The power company already faces the extremely difficult task of decommissioning the Fukushima No. 1 nuclear plant. In order to smoothly carry out the decommissioning of the No. 2 plant as well, the company must exercise wisdom in allocating its management resources, such as funds and personnel.

We hope TEPCO will cooperate with the government in swiftly materializing its plan for decommissioning the No. 2 power station.

The decommissioning of the Fukushima No. 2 plant would leave the Kashiwazaki-Kariwa Nuclear Power Plant in Niigata Prefecture as TEPCO's sole atomic power station. This means that TEPCO may step up its efforts to persuade the local municipalities hosting that power plant to accept its reactivation. However, the company must keep in mind that the main priority is to ensure safety at the plant and to obtain the understanding and acceptance of local communities.

TEPCO told to hear local views for scrapping plant

https://www3.nhk.or.jp/nhkworld/en/news/20180615_22/

Japan's economy and industry minister has told Tokyo Electric Power Company to take local opinion into account when drawing up a plan to scrap another nuclear power plant in Fukushima Prefecture.

Hiroshige Seko gave the instruction to TEPCO President Tomoaki Kobayakawa on Friday.

The move came one day after Kobayakawa informed the Fukushima prefectural governor of TEPCO's intention to decommission the Fukushima Daini nuclear power plant.

The plant has been offline since the March 2011 earthquake and tsunami that caused meltdowns at the Fukushima Daiichi plant, also in the prefecture.

Seko said he appreciates that the utility accepted the current situation in the prefecture.

He told TEPCO to communicate with the local community to create a decommissioning plan from the standpoint of contributing to post-disaster reconstruction.

Kobayakawa told reporters after the meeting that his company will proceed with drafting the plan while trying to ensure that people in Fukushima can feel safe and contribute to reconstruction efforts.

He said details of the plan will be decided by taking into account the timetable and workforce allocation for scraping reactors of Fukushima Daiichi.

July 31, 2018

TEPCO to open decommissioning museum (and draw lessons...)

A rendering of a stage, which projects the life-size cross-section of a nuclear reactor, enabling visitors to see inside of the reactor that suffered a meltdown, using computer graphics and actual footage. (Photo courtesy of Tokyo Electric Power Co.)

TEPCO to open museum to display decommissioning process for Fukushima reactors

https://mainichi.jp/english/articles/20180731/p2a/00m/0na/022000c

TOMIOKA, Fukushima -- Tokyo Electric Power Co. (TEPCO) announced on July 27 that it will open a museum here to display exhibitions in relation to the Fukushima No. 1 Nuclear Power Plant disaster and its decommissioning work.

- 【Related】TEPCO eyes 1st contact with fuel debris in damaged nuke reactor from Oct.
- 【Related】Tepco gets low rating for nuclear accident drills, draws criticism
- 【Related】Tepco to resume TV commercials, 1st time since 2011 Fukushima crisis

The exhibition, which is scheduled to start in November 2018, will mostly display films in which actors re-enact scenes in the form of dramas, to inform visitors of how the Fukushima nuclear disaster that began on March 11, 2011, was handled and follow-up work, in sections titled, "Memories and records" and "Reflections and lessons." On a different floor, drama footage introducing measures taken to lower the risk of decommissioning work and descriptions of the enormous worksite will be screened in sections titled, "Conditions at the scene" and "Progress of the work."
There will also be a stage in which a life-size cross-section of a nuclear reactor is projected, using both computer graphics and actual footage. Visitors can also experience a simulation of the situation at the time of the meltdowns and see images of the actual debris.
Makoto Okura, head of TEPCO's Fukushima Revitalization Headquarters, stated at a press conference, "I want the museum to serve as a venue for people hesitant to come back to local areas to understand what kind of accident it was, and what it's like in reality."
The venue for the museum will be a refurbished former Energy Kan building in the Fukushima Prefecture town of Tomioka, which was shut down after the disaster. The exhibition space is approximately 1,900 square meters spread over two stories. Entry to the museum will be free.
(Japanese original by Hideyuki Kakinuma, Fukushima Bureau)

August 30, 2018

Decommissioning starts at Monju

Work starts to decommission problem-plagued Monju reactor

http://www.asahi.com/ajw/articles/AJ201808300045.html

The Japan Atomic Energy Agency (JAEA) on Aug. 30 started work to decommission the Monju prototype fast-breeder reactor in Fukui Prefecture, a once-promising project that struggled with problems, even in preparations for its dismantlement.
The work started a month later than scheduled because of a series of equipment trouble. The JAEA workers also face an enormous challenge because Japan has no experience in decommissioning a fast-breeder reactor.
The JAEA will use overseas experiences as a reference for the delicate process.
Before the start of the work, JAEA President Toshio Kodama told staff members in a speech at the plant in Tsuruga, “I want you to tackle this work by bracing yourselves.”
Monju had been a key facility in the government’s nuclear fuel recycling program.
Construction of the reactor started in 1985, but a series of accidents, including a sodium coolant leak in 1995, as well as cover-ups kept the reactor offline for most of its life.

In 2016, after 1 trillion yen ($9 billion) had been spent on the project, the government finally decided to abolish Monju.
The decommissioning work is scheduled to take 30 years and cost 375 billion yen.
One of the riskiest parts in the decommissioning process is handling the liquid sodium, which reacts strongly with water and air.
In the first of the four-stage decommissioning project, the JAEA will transfer 530 nuclear fuel assemblies, currently kept in the liquid sodium-filled nuclear reactor and storage tank, to a water-filled pool by fiscal 2022.
In the work that began on Aug. 30, the JAEA will remove 160 nuclear fuel assemblies from the storage tank, wash away the sodium, and place them in the pool.
From 2019, the agency will transfer nuclear fuel assemblies from the reactor to the storage tank and then to the pool.
In December this year, the JAEA will also start to transfer about 760 tons of sodium, which has not been exposed to radioactive substances, to its storage tank. Later, the agency will remove about 910 tons of radioactive sodium from the reactor and other equipment.
In the following stages, the agency will dismantle the nuclear reactor, the turbine and other facilities.
However, no decision has been made on how to dispose of the nuclear fuel removed from the reactor and the storage tank. Monju has used mixed oxide (MOX) fuel, which contains plutonium and currently cannot be reprocessed in Japan.
“It’s realistic to ask an overseas company to reprocess it,” said Toyoshi Fuketa, chairman of the Nuclear Regulation Authority, the government’s nuclear watchdog.
If reprocessing expenses in a foreign country are added, the overall decommissioning costs will sharply increase.

August 31, 2018

Safety vital in scrapping Monju

EDITORIAL: Safe and steady progress needed to finally end Monju debacle

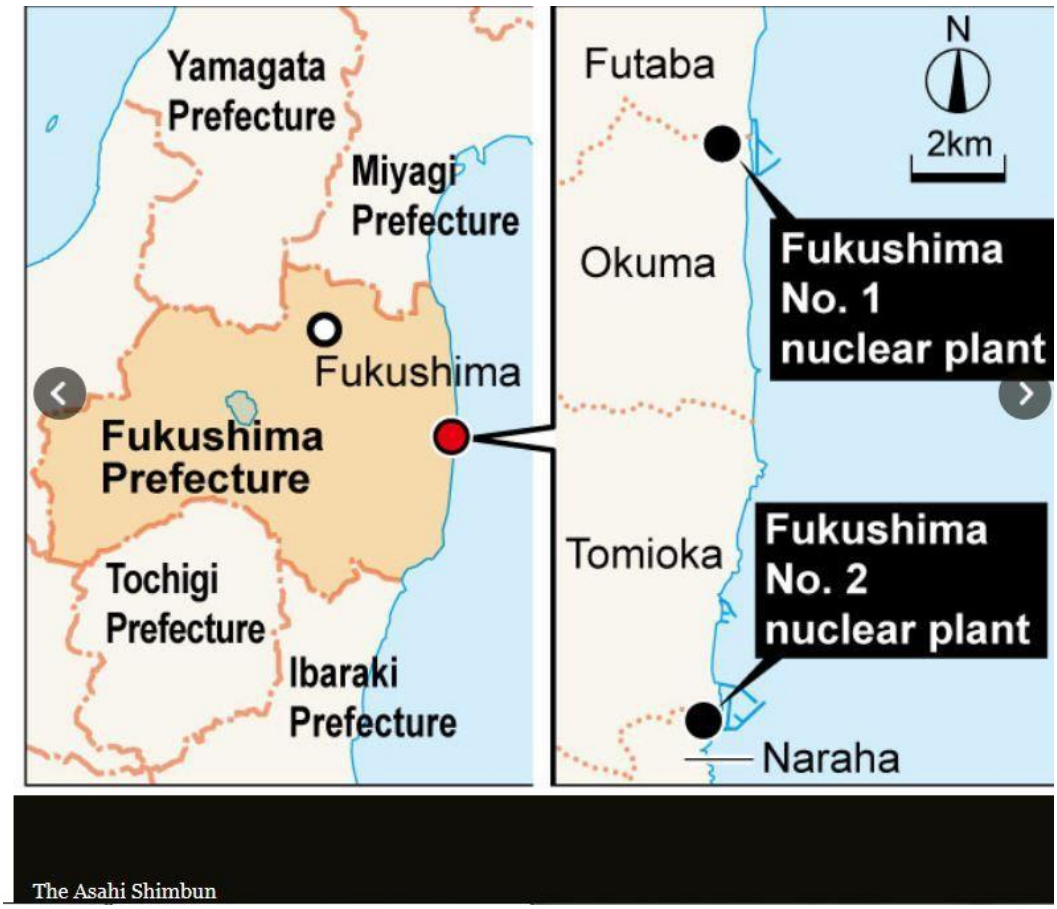
http://www.asahi.com/ajw/articles/AJ201808310018.html

The Japan Atomic Energy Agency (JAEA) on Aug. 30 started work to remove nuclear fuel from the Monju prototype fast-breeder reactor in the first stage of decommissioning the trouble-prone experimental reactor in Tsuruga, Fukui Prefecture.
It is the first step in a long and grueling process that will take three decades. Safe and steady progress is vital for achieving the goal.
Monju burns uranium-plutonium mixed oxide (MOX) fuel and is cooled by liquid sodium, instead of water.
Monju worked only very briefly during the more than 20 years of its life, and the government decided to pull the plug on the reactor at the end of 2016.
While the work to remove fuel continues, the liquid sodium coolant will be extracted from Monju, and related equipment will be dismantled. The reactor building will then be demolished and removed.
There have only been 10 or so cases of decommissioning a fast reactor in the world. These rare projects have been carried out in such countries as the United States, Britain and France. Maximum caution is in order to ensure safety in the process.
Plutonium is a material used to make atomic bombs. To avoid causing unnecessary concerns about nuclear proliferation, the operator should adequately share information about fuel transfer work with the International Atomic Energy Agency (IAEA).

According to the JAEA's plan, 530 fuel assemblies will be removed from the reactor core and the storage tank outside the reactor, which are filled with sodium coolant. The fuel assemblies will be cleaned before being transferred to an on-site water-filled storage pool. This stage is scheduled to be completed by fiscal 2022.
Since sodium is not transparent, it is impossible to see the fuel assemblies submerged in liquid sodium while retrieving them.
Only two fuel assemblies have ever been transferred to the pool at the Monju plant. There are only about 10 workers who have experienced the task.
During a test operation eight years ago, refueling equipment fell into the reactor vessel. Work to remove fuel was originally scheduled to begin in late July, but the start has been delayed by one month due to a series of troubles with related equipment.
A rigorous system of checks and double-checks is indispensable for ensuring steady progress in the project.
Removing fuel is not the only part of the process that requires great care and caution. Sodium reacts violently with water or air. A sodium leak accident at Monju in 1995 caused a fire. Radioactive sodium requires particularly cautious handling.
The JAEA is known for its problem-plagued history. It has been criticized for poor safety consciousness and lax discipline.
While scrapping Monju, the JAEA will also decommission its facility to extract unused fissionable material, plutonium to be exact, from spent nuclear fuel in Tokai, Ibaraki Prefecture, in a 70-year-long process.
That means the JAEA will have to maintain high levels of alertness, attentiveness and discipline for a very long period of time.
Some 1.1 trillion yen ($10 trillion) has already been spent on the Monju project, and decommissioning the reactor will cost at least 375 billion yen. Most of the money has been or will be paid by taxpayers.
No sharp increase in the cost of decommissioning due to glitches or human errors is acceptable.
It should not be forgotten that the process also poses one common and sticky challenge involved in decommissioning any nuclear reactor.
No decision has been made on how to dispose of the nuclear fuel, sodium and other radioactive waste that will be produced in the decommissioning process.
Instead of postponing actions to tackle this challenge, the government should immediately embark on serious efforts to find a solution to this tough question.

October 18, 2018

Closing Fukushima No.2



Nuclear plant closure brings hope, despair to Fukushima town

http://www.asahi.com/ajw/articles/AJ201810180001.html

NARAHA, Fukushima Prefecture--Naraha's anti-nuclear wish has been granted, and now this population-depleted town faces a future without its main source of revenue and major supplier of jobs.

In the aftermath of the Fukushima nuclear disaster in 2011, Naraha decided to oppose nuclear energy and call for the closure of the Fukushima No. 2 nuclear power plant that it co-hosts on the coast of the prefecture.

Tokyo Electric Power Co. in June finally said it plans to decommission the No. 2 plant.
Although anti-nuclear activists cheered the decision, not everyone in Naraha was happy.
Since the 1970s, the town has been home to the No. 2 plant, which first went into service in 1982.

For decades, Naraha has received central government grants and subsidies for hosting the No. 2 plant, as well as tax revenues from TEPCO and its affiliates operating in the town.

The plant also employed 860 people, many of them from Naraha and its surrounding communities.

Naraha had a population of about 8,000 before the Great East Japan Earthquake and tsunami caused the triple meltdown at TEPCO's Fukushima No. 1 nuclear plant in March 2011. The crippled plant is located within 20 kilometers from Nahara.

The quake and tsunami also created a scare at the No. 2 plant by leaving the facility with only a limited power supply from external sources and emergency diesel generators to cool the reactors. But the plant brought the situation under control.

After long remaining silent about the fate of the No. 2 plant, TEPCO decided to retire all of its four reactors, which were approaching their legal operating limit of 40 years.

If the power company wanted to continue operations at the plant, it would have to spend hundreds of billions of yen on upgrades to meet the more stringent safety standards that were set after the accident at the No. 1 plant.

A town assembly session in September was dominated by questions about Naraha's financial status.

"How much in local tax did TEPCO and its affiliates pay the town last fiscal year?" an assembly member asked.

"About 52 percent of the town's overall revenues of 1.93 billion yen ($17 million)," replied a town official.

"And how much in nuclear energy-related grants from the central government was given to the town?" the assembly member continued.

"About 1.1 billion yen," another official answered.

Naraha will lose its eligibility to receive the grants once TEPCO's plan to decommission the No. 2 plant becomes official.

The assembly member kept pressing the town government for specific plans to secure new revenue sources.

Mayor Yukiei Matsumoto took the rostrum and said, "We will request a new grant from the central government."

Matsumoto was referring to a "special grant" that the central government established after the Fukushima meltdowns to mitigate the financial impact on Okuma and Futaba, the two towns co-hosting the Fukushima No. 1 nuclear plant, and nearby municipalities.
The new grants, which started in fiscal 2015, are intended to supplement their revenues.

A total of about 250 billion yen will be used for the special grants over 30 years.
Under this setup, 8.3 billion yen was paid to the Fukushima prefectural government in fiscal 2016, of which 2.1 billion yen went to Okuma and about 1 billion yen to Futaba in subsidies.

Part of the remainder was used to build training facilities for five sports, including canoeing and clay shooting, in the prefecture, and to renovate greenhouses at an agricultural high school in Aizubange, a town about 120 kilometers from the Fukushima No. 1 nuclear plant.

The nuclear disaster at the No. 1 plant forced residents to evacuate Naraha.
The evacuation order was lifted in September 2015, but only around half of the town's residents have returned permanently.

Many Naraha evacuees have started new lives in other municipalities. And the town's infrastructure, such as supermarkets and medical institutions, has still not been fully restored to pre-disaster levels.

In Tomioka, the other co-host of the No. 2 plant, less than 10 percent of residents have returned since the entry ban was lifted in spring last year for most of the town.

Although Naraha and Tomioka officials share concerns about their municipalities' financial futures, they see a silver lining in the situation at the Fukushima No. 1 nuclear plant.

Both towns have served as front-line bases for workers involved in decommissioning of the stricken plant.

About 5,000 workers a day who are involved in the decommissioning effort provide steady business for convenience stores and other shops in the two towns.

Business hotels, dorms and apartment buildings have been built in the towns and neighboring communities to accommodate the workers.

Work to dismantle the No. 1 plant is expected to take decades to complete.
Local officials said the closure of the No. 2 plant could bring about a similar economic boon.

"Decommissioning can become a major industry," Naraha Mayor Matsumoto said.

October 19, 2018

Distrust an obstacle to decommissioning

Distrust of TEPCO Hampers Decommissioning

https://www3.nhk.or.jp/nhkworld/nhknewsline/backstories/distrustoftepco/

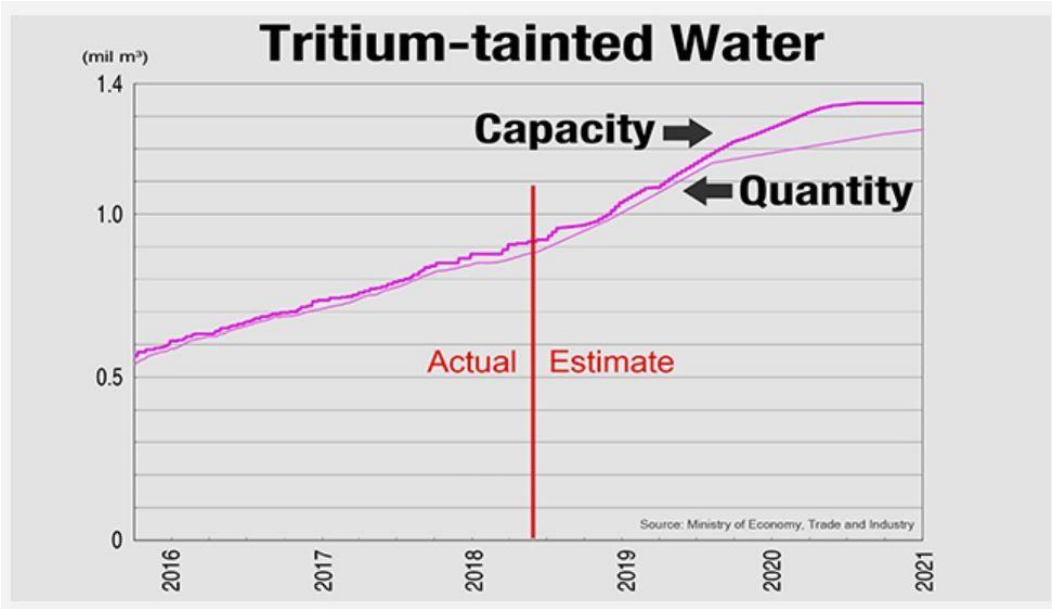
A major challenge at the Fukushima Daiichi nuclear power plant is disposing of water containing a large amount of radioactive tritium. The Japanese government proposed diluting and releasing the water into the sea, but many fisheries in Fukushima are voicing strong opposition to the proposal. Disposal of the tainted water is a must for scrapping reactors at the plant. So, what should the government and TEPCO officials do?

Doing away with tritium-tainted water is essential

Every day, more than 100 tons of radioactive water builds up. Despite various measures taken since the 2011 accident at Fukushima Daiichi, groundwater continues to enter the reactor buildings, mixing with water which is being used to cool the reactors.
The Tokyo Electric Power Company uses a system called ALPS to treat the water. Officials have been saying that the system's high-performance filters can get rid of most radioactive substances, except tritium.

TEPCO is not allowed to dispose of that water because its tritium levels surpass the limit set by the government.

That's why the utility is storing 920,000 tons of the water in more than 800 tanks. The water is expected to increase by up to about 100,000 tons a year. The government and the firm say that in a matter of years, Fukushima Daiichi will run out of space for tanks.



A government panel of experts has been discussing what to do with the water. The experts concluded that the technology for separating tritium cannot be put into practical use yet. They instead put several options on the table such as:

1) Diluting and releasing the water into the sea
2) Heating and evaporating the water
3) Burying the water deep underground

A report later compiled by the panel said releasing the water into the sea will make the most sense. Experts say this is the cheapest and quickest way among all the options. The question is, is it safe?

Tritium exists in the atmosphere. The government, TEPCO and the Nuclear Regulation Authority say tritium emits a weaker form of radiation than other radioactive substances. They say that even if tritium enters the human body, it will be incorporated into water and quickly released outside. Officials say therefore, tritium is likely to pose few health risks if its concentration is low.

In the past, nuclear power plants across Japan actually released water containing tritium after confirming its readings were below the limit.

NRA Chairman Toyoshi Fuketa has been calling on the government and TEPCO to make a quick decision, saying releasing the water into the sea after its tritium level falls below the limit is the only viable option. He thinks the approval process for the proposal is unlikely to take long, so it will have limited impact on the work to scrap the reactors.

Mounting distrust among fisheries

After the expert panel compiled its report, the government held public hearings to make a final decision. At a hearing held in the town of Tomioka in Fukushima Prefecture on August 30th, the proposal came under fire mainly from people in the fishing industry.

The head of the Fukushima Prefectural Federation of Fisheries Cooperative Associations said the proposed move will be a devastating blow to the local fishing industry. He said its past efforts will go to waste, and it will deprive the industry of its motivation for rebuilding businesses.

Fishermen in Fukushima suspended their operations after radioactive materials exceeding the government-set limits were detected in seafood caught off the prefecture following the 2011 accident. But in recent years, no fish from the area have been found to be highly radioactive. Now, fishermen can catch and ship most kinds of fish.
However, some consumers still hesitate to eat marine products from Fukushima. Fish landings are still about one-tenth of levels before the accident. Local fisheries fear that if TEPCO releases the water into the ocean, they will have to delay their plans to resume operations at full capacity and struggle again to make ends meet -- even if the water is deemed safe.

The underlying problem is distrust towards the government and TEPCO. There have been numerous instances in which TEPCO withheld the fact that tainted water had leaked into the sea. Locals saw them as acts of betrayal. They fear that once TEPCO begins dumping the water into the sea, consumers may refrain from purchasing fishery products from Fukushima Prefecture even further.

Public distrust further deepened during the hearings. It came to light that the water stored in some of the tanks contains levels of radioactive substances, such as iodine that exceed the limit. This contradicts the explanation given by the government and TEPCO -- that the water treatment system can reduce all radioactive substances to a level below the limit, except for tritium.

My understanding was that tritium was the only radioactive substance in the tanks that exceeds the government-set limits. I was not the only one who was confused. Other participants also expressed concerns that TEPCO may have been concealing the facts.
TEPCO officials explained that levels of some radioactive substances could exceed the limits if the water treatment filters are used continuously. They said that's not a problem, adding that the goal is to reduce the risk of radiation exposure, and that they have been making the data public on their website.

After hearing this, I checked TEPCO's website once again. There, I found the iodine levels, but they were buried in a massive amount of data, making it very difficult to find. TEPCO officials didn't seem eager to provide a full explanation of what has happened so far.

But TEPCO's claim that this isn't a problem differs with the public's view. Its attitude is worsening the problem.

TEPCO officials tend to make decisions based on technical considerations, which often fail to sufficiently acknowledge the concerns of the locals. The officials also appear reluctant to release information that is inconvenient for them. Unless they change their mindset, they will not be able to regain the public's trust.

Steps TEPCO must take to regain trust

First and foremost, the government and TEPCO must provide thorough explanations and responses to the questions and opinions expressed in the hearings. They need to clarify why they didn't proactively explain the level of radioactive substances and provide their exact levels and how they will deal with them.

In addition, the government should hold public hearings at various other locations and communicate more with the public. The latest round of public hearings was held only in Fukushima and Tokyo and this didn't seem sufficient to regain public support.

Decommissioning of the crippled Fukushima Daiichi nuclear plant is a prerequisite for the reconstruction of areas devastated by the nuclear disaster. To this end, treatment of contaminated water is a must, and it needs be done swiftly. However, there will not be progress, no matter which method is taken, without the consent of the people affected by the nuclear disaster.

TEPCO and government officials must offer truthful updates as soon as they happen. While this sounds obvious, it's the only way to regain people's trust and resolve the problem of the accumulation of tainted water.

October 25, 2018

Onawaga No.1 to be scrapped

Utility plans to scrap reactor at Onagawa plant

https://www3.nhk.or.jp/nhkworld/en/news/20181025_33/

Tohoku Electric Power Company has told Miyagi Prefecture that it is going to decommission an aging reactor at its Onagawa nuclear power plant.

The 3 reactors at the plant in northeastern Japan have been offline since the March 2011 earthquake and tsunami.

The utility's president, Hiroya Harada, conveyed its decision to Miyagi Governor Yoshihiro Murai on Thursday.

Harada explained that additional safety steps would create technical difficulties as the No.1 reactor is more than 30 years old. The measures are required under government regulations that were introduced after the 2011 disaster.

Murai asked Tohoku Electric Power to put top priority on safety in scrapping the reactor as the work is expected to take a long time. The governor also asked the utility to properly disclose information and maintain stable power supplies.

The utility hopes to put the 2 other reactors back into operation. The No.2 reactor is being checked by the nuclear regulator, and the firm is preparing to apply for an inspection of the No.3 reactor.

Utilities have decided to decommission 10 reactors at 7 plants, including Onagawa, since the 2011 disaster at the Fukushima Daiichi plant. They cite the huge cost of additional safety measures. These figures do not include the all 6 reactors at Fukushima Daiichi.

See also:

Tohoku Electric to scrap aging No. 1 unit at Onagawa nuclear plant

https://www.japantimes.co.jp/news/2018/10/25/national/tohoku-electric-scrap-aging-no-1-unit-onagawa-nuclear-plant/#.W9GmUDGYSos

Kyodo
SENDAI – Tohoku Electric Power Co. said Thursday it will scrap the idled No. 1 unit at its Onagawa nuclear power plant in Miyagi Prefecture, more than 30 years after it started operations. [...]

October 26, 2018

Tohoku Electric to scrap aging Onagawa nuke plant reactor over maintenance costs

https://mainichi.jp/english/articles/20181026/p2a/00m/0na/027000c

Tohoku Electric Power Co. has decided to decommission the idled No. 1 reactor at its Onagawa Nuclear Power Station in the northeastern Japan prefecture of Miyagi, the utility's president Hiroya Harada announced on Oct. 25.

- 【Related】Tohoku Electric to scrap aging No. 1 unit at Onagawa nuclear plant
- 【Related】Tohoku Electric considering decommissioning Onagawa nuke plant reactor
- 【Related】Tokai No. 2 nuke plant passes tighter safety checks introduced after 2011 quake

The company decided to scrap the reactor after determining that it would be burdensome to bring it up to new safety standards implemented in the wake of the Fukushima nuclear disaster triggered by the March 2011 Great East Japan Earthquake and tsunami.

To bring the plant back online, Tohoku Electric would need to greatly strengthen the reactors against earthquakes and tsunamis, and provide measures against terrorism to pass strict screening by the Nuclear Regulation Authority (NRA). Though the company has not provided details of the required work, it is believed it would cost a huge amount.
Furthermore, a rule implemented in the wake of the Fukushima disaster limits the operational life of nuclear reactors to 40 years in principle, and 34 years have passed since the Onagawa plant's No. 1 reactor went into service in June 1984. This means the reactor could only operate for a few years even if it were reactivated.

Additionally, the No. 1 reactor has an output of just 524,000 kilowatts, smaller than the 825,000 kilowatts of the plant's No. 2 and 3 reactors. All three reactors at the plant -- the oldest of four nuclear stations operated by Tohoku Electric -- remain idled in the wake of the 2011 tsunami, which flooded the No. 2 reactor building.

In its basic energy plan, the government has designated nuclear power as an important baseload source of energy, and it aims to increase the rate of nuclear power generation in the country to 20-22 percent of total electricity production by fiscal 2030. This is premised on having around 30 nuclear power reactors in operation, but since the Fukushima nuclear disaster, just nine reactors have passed NRA screening and been reactivated.

The decision to dismantle the No. 1 reactor at the Onagawa plant means that 10 reactors at seven plants -- not including the reactors at the disaster-stricken Fukushima Daiichi Nuclear Power Station in northeastern Japan -- have now been slated for decommissioning.

"Even if other nuclear power plants are reactivated in the future, unless exemptions are permitted to allow the reactors to operate for up to 60 years, then reactors will start being decommissioned one after another. Reaching the target nuclear power ratio in (Japan's) energy is quite a high hurdle," an official at one major power company commented.

(Japanese original by Atsuko Motohashi, Sendai Bureau; Takayuki Hakamada, Business News Department; and Riki Iwama, Science & Environment News Department)

December 28, 2018

Decommissioning costs

Costs to decommission JAEA nuclear facilities estimated at ¥1.9 trillion, agency says

https://www.japantimes.co.jp/news/2018/12/28/national/cost-decommissioning-jaea-nuclear-facilities-put-1-9-trillion/#.XCYs9mlCf0M

JIJI

The costs to decommission 79 nuclear facilities owned by the Japan Atomic Energy Agency have been estimated to total ¥1.9 trillion over some 70 years, according to the agency.

The estimated sum covers costs for scrapping buildings and disposing of radioactive waste, but does not include maintenance costs. The JAEA owns 89 nuclear facilities.

A nuclear fuel reprocessing plant in the village of Tokai, Ibaraki Prefecture, is the most costly at ¥770 billion.

In June last year, the JAEA said costs for decommissioning the Tokai plant would total ¥1 trillion. The latest estimates do not include the ¥217 billion in costs for solidifying highly radioactive wastewater.

The JAEA said estimated decommissioning costs total ¥150 billion for the Monju prototype fast-breeder reactor in Tsuruga, Fukui Prefecture, ¥75 billion for the Fugen advanced converter reactor and ¥88 billion for a plutonium fuel plant in Tokai.

The JAEA did not include maintenance and other costs in the estimates as they are variable depending on facilities and decommissioning work phases, an official said.

February 22, 2018

Greenpeace report on contaminated water tanks

Technical failures increase risk of contaminated Fukushima water discharge into Pacific – Greenpeace

https://www.greenpeace.org/international/press-release/20351/technical-failures-increase-risk-of-contaminated-fukushima-water-discharge-into-pacific-greenpeace/

by Greenpeace International

Tokyo, 22 January 2019 – The nuclear water crisis at the Fukushima Daiichi plant has been compounded by multiple technical failures and flawed decision making driven by short term cost cutting by the Japanese government and TEPCO, a new Greenpeace Germany analysis concludes.
The report details how plans to discharge over 1 million tonnes of highly contaminated water into the Pacific Ocean was proposed by the same Government task force that ignored alternative options that would have avoided threatening further contamination of the ocean.
"The decision not to develop water processing technology that could remove radioactive tritium was motivated by short term cost cutting not protection of the Pacific ocean environment or the health and livelihoods of communities along the Fukushima coast," said Kazue Suzuki, Energy Campaigner at Greenpeace Japan. "We have raised the water crisis with the UN International Maritime Organization and firmly stand with local communities, especially fisheries, who are strongly opposed to any plans to discharge contaminated water into their fishing grounds."
The report concludes that the water crisis remains unresolved, and will be for the foreseeable future. The only viable option to protect the environment and the communities along the Fukushima coast being long term storage for the contaminated water.
The discharge option for water containing high levels of radioactive tritium was recommended as least cost by the Government's Tritiated Water Task Force and promoted by Japan's Nuclear Regulation Authority (NRA). The Task Force concluded in 2016 that "sea discharge would cost 3.4 billion yen (US$30 million) and take seven years and four months to complete. It concluded that this was cheapest and quickest of the five methods." However, technical proposals for removing tritium were submitted to the same Government Task Force by multiple nuclear companies with estimated costs ranging from US$2-US$20 billion to US$50-US$180 billion depending on the technology used. These were dismissed as not viable but without detailed technical consideration.
TEPCO has claimed since 2013 that its ALPS technology would reduce radioactivity levels "to lower than the permissible level for discharge." However, in September 2018 TEPCO admitted that the processing of over 800,000 tons of contaminated water in 1000 storage tanks, including strontium, had failed to remove radioactivity to below regulatory limits, including for strontium-90, a bone seeking radionuclide that causes cancer. TEPCO knew of the failure of the technology from 2013. The Greenpeace report details technical problems with the ALPS system.
The Fukushima Daiichi site, due its location, is subject to massive groundwater contamination which TEPCO has also failed to stop. Each week an additional 2-4000 tonnes of contaminated water is added to the storage tanks.
"The Japanese government and TEPCO set an objective of 'solving' the radioactive water crisis by 2020 – that was never credible. TEPCO has finally admitted that its ALPS technology has failed to reduce levels of strontium, and other hazardous radioactivity, to below regulatory limits," said Shaun Burnie, nuclear specialist with Greenpeace Germany.
"The reality is there is no end to the water crisis at Fukushima, a crisis compounded by poor decision making by both TEPCO and the government. Discharging into the Pacific is the worst option and must be ruled out. The only viable option, and it's not without risks, is the long term storage of this water in robust steel tanks over at least the next century, and the parallel development of water processing technology."
Greenpeace offices are calling on the government and TEPCO to urgently reassess options for the long term management of highly contaminated water at Fukushima Daiichi. Paramount in any future

decision making should be the protection of the environment and the interests of the those in the front line – the communities and fishing industries of Fukushima's Pacific coast.

Photos and video can be accessed here

Notes:
"TEPCO Water Crisis" briefing can be accessed here
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February 13, 2019

Genkai No.2 reactor to be decommissioned

Kyushu Electric to decommission a 2nd reactor at its Genkai plant

http://www.asahi.com/ajw/articles/AJ201902130036.html

Kyushu Electric Power Co. has decided to decommission a second reactor at its Genkai nuclear plant in Saga Prefecture rather than implement a costly upgrade to meet stricter safety standards.

The company balked at the huge investment needed to construct a facility to prevent terrorist attacks, one of the new safety requirements for all nuclear plants, in light of the reactor's low power output and impending end of its operational life, according to several utility sources.

The Genkai No. 2 reactor will become the 21st reactor to be decommissioned after the 2011 triple meltdown at the Fukushima No. 1 nuclear power plant.

Kyushu Electric sources noted that another factor in the decision concerned the difficulties the company encountered in acquiring the land needed to construct an anti-terrorist facility for the No. 2 reactor.

The No. 2 reactor had already shut down for a regular maintenance inspection when the Fukushima nuclear disaster unfolded, and never went back online.

Given that the reactor's 40-year operational life will be reached in March 2021, utility officials pondered whether to keep it running or decommission it.

Company officials determined that anticipated economic returns could not justify the huge outlay required for the tougher safety standards.

The tab to meet the new safety standards was estimated at 200 billion yen ($1.8 billion).

The No. 2 reactor only has an output of about 560,000 kilowatts, which is less than half the output of the No. 3 and No. 4 reactors that have resumed operations at the Genkai plant.

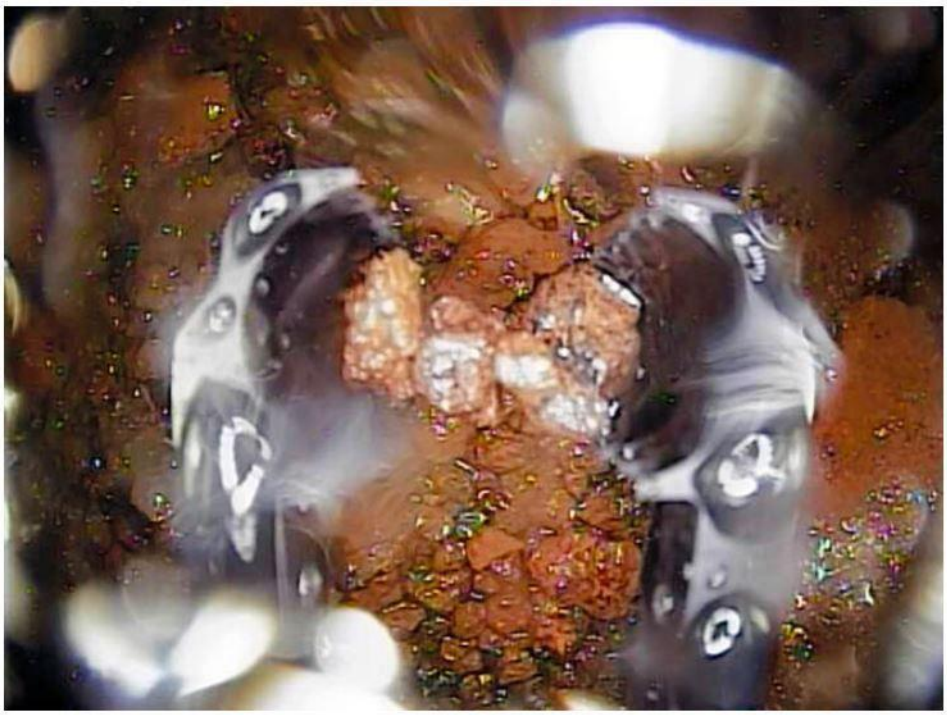
Kyushu Electric decided in 2015 to decommission the Genkai No. 1 reactor, which had the same output as the No. 2 reactor, and has already started work.

Only four reactors that were reaching the end of their operational lives have so far been allowed an extension. In each case, the reactors had an output in excess of 800,000 kilowatts.

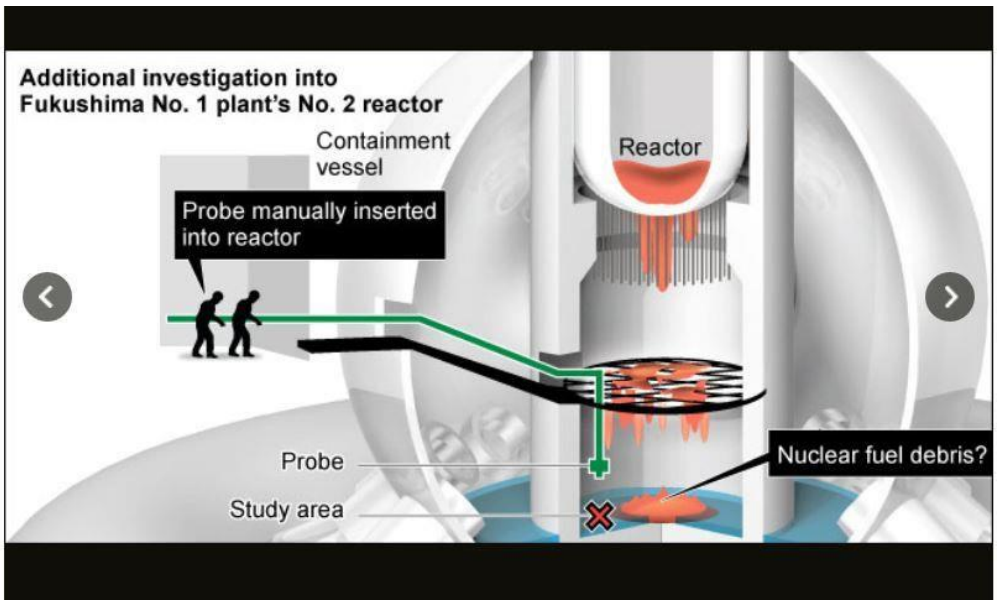
(This article was written by Yuji Yamashita and Naoyuki Takahashi.)

February 14, 2019

Probe lifts nuclear debris from bottom of No.2 for investigation



A probe used in Tokyo Electric Power Co.'s investigation on Feb. 13 picks up pebble-like nuclear fuel debris in the No. 2 reactor at the Fukushima No. 1 nuclear plant. (Provided by Tokyo Electric Power Co.)



1st contact made with melted nuclear fuel at Fukushima plant

http://www.asahi.com/ajw/articles/AJ201902140041.html

By CHIKAKO KAWAHARA/ Staff Writer

A probe touched melted nuclear fuel debris in a destroyed reactor at the Fukushima No. 1 nuclear plant, a long-awaited milestone in the battle toward decommissioning, Tokyo Electric Power Co. said Feb. 13.

The rod-like probe, fitted with 3-centimeter-long claws, lifted pieces of the nuclear fuel debris during the eight-hour operation at the bottom of the No. 2 reactor at the plant, the utility said.

Data obtained through the investigation, such as the hardness, temperature and radioactivity of the debris, will be used to develop equipment and containers for the eventual removal of the melted fuel. The probe, which was recovered after the investigation, also took pictures of the inside of the containment vessel.

No debris was taken outside the reactor, according to TEPCO.

The retrieval process will start in earnest at one of the reactors in 2021, according to the plan drawn up jointly by the central government and TEPCO.

It was the first physical contact with melted fuel at the plant since the Great East Japan Earthquake and tsunami on March 11, 2011, caused the meltdowns of three reactors there.

It took TEPCO years just to locate the melted fuel debris because of the high radiation levels in the reactor buildings.

The utility said workers manually inserted the probe through a crack created early in the disaster on the side of the No. 2 reactor's containment vessel.

The probe, which resembles a prize-grabbing crane machine at a game arcade, was also equipped with a dosimeter and a camera. It can extend 15 meters and can lift pieces up to 8 centimeters in diameter and weighing 2 kilograms.

Workers remotely operated the probe from the operating room in a building close to the No. 2 reactor building, and lowered it to the bottom of the reactor's containment vessel.

The probe lifted pebble-like nuclear fuel debris and structural parts up to 8 cm in diameter at five spots in the 2,500-square-cm area that was investigated. It failed to pick up debris at one spot.

TEPCO said the probe could not lift clay-like debris likely because it had adhered to the bottom of the containment vessel.

The probe also touched nuclear fuel debris lying at several spots on the lattice-shaped scaffold for workers directly below the reactor's pressure vessel.

The previous investigation of the No. 2 reactor in 2017 located melted fuel debris on the scaffold. But a robot deployed for a further investigation broke down on its way to the debris.

In a survey last year, the utility used the rod-like probe to take images of the inside of the reactor.

TEPCO is expected to remove a small amount of nuclear fuel debris in the second half of fiscal 2019 as part of preparations for full-scale retrieval.

February 16, 2019

Nightmare ahead

VOX POPULI: '1st contact' with melted nuclear debris points to nightmare ahead

http://www.asahi.com/ajw/articles/AJ201902160016.html

Traffic safety classes are often held for the benefit of elementary school pupils.
But one given earlier this month in Miyako, Iwate Prefecture, was of special significance.

Because of extensive damage done to the local railway system by the Great East Japan Earthquake of 2011, most of the children had never seen a functioning railroad crossing. But they were finally taught the basics of how to safely cross one, according to the Iwate Prefecture edition of The Asahi Shimbun.

"Never walk into the crossing while the alarm is on," warned a railway company worker. "Never cross the tracks where there is no crossing gate" was another crucial advice.

The Asahi story was accompanied by a photo of these children crossing the tracks with their hands raised.

The local train service will reopen between Miyako and Kamaishi on March 23, now that the tsunami-damaged train stations and tracks have been restored.

Eight years after the devastating earthquake and tsunami, life is finally regaining some normalcy in the affected areas. The passage of time reminds me of the grief that confronted the survivors for all those days and months.

But where the flow of time is concerned, an entirely different "world" exists for the Fukushima nuclear disaster and its aftermath.

Tokyo Electric Power Co., the operator of the Fukushima No. 1 nuclear plant, made the first physical contact on Feb. 13 with melted nuclear debris at the bottom of the plant's No. 2 reactor.

A rod-like probe, inserted into the reactor, reportedly picked up lumps of debris the size of small stones. The utility says the project will prove useful when retrieval work starts in earnest in 2021.

Images have been released of the reddish-brown amorphous mass. But its level of radioactivity is still unknown, which means that TEPCO has not even reached the earliest stage of its reactor decommissioning process.

I am acutely reminded again of the magnitude of this irreversible mess.

The technology we are left with is an out-of-control monster. And so long as nuclear power plants remain in operation, there is no guarantee that the same nightmare will not recur--even as we speak.

Removing the 566 fuel assemblies from No.3 reactor

TEPCO training workers to shift spent nuclear fuel from March

http://www.asahi.com/ajw/articles/AJ201902160021.html

By CHIKAKO KAWAHARA/ Staff Writer
Tokyo Electric Power Co. has instituted a rigorous training program so technicians can proceed with the removal in late March of spent nuclear fuel from the No. 3 reactor of the Fukushima No. 1 nuclear power plant.

A reporter from The Asahi Shimbun was permitted to observe a session Feb. 15 that involved using a huge 50-ton crane to lift and move a container, simulating the conditions under which spent nuclear fuel would be recovered.

The No. 3 reactor has 566 nuclear fuel assemblies stored in the fuel pool on the top floor of the reactor building.

Moving the spent nuclear fuel is considered an urgent task due to fears the crippled facility could be further damaged in the event of another major earthquake or tsunami.
Plans call for removing seven fuel assemblies in late March.

A new roof for the reactor building was completed last year to contain any radioactive fallout.

A hydrogen explosion blew the original roof apart shortly after the magnitude-9.0 Great East Japan Earthquake of March 2011 that generated towering tsunami, inundating the plant's cooling system and triggering the nuclear disaster.

February 18, 2019

Still a formidable challenge

EDITORIAL: Probe shows challenges posed by melted fuel at Fukushima plant

http://www.asahi.com/ajw/articles/AJ201902180019.html

A specially designed, remotely controlled probe touched melted nuclear fuel debris at the bottom of a ruined reactor at the Fukushima No. 1 nuclear power plant in the first successful operation to inspect radioactive debris through direct contact.

The plant's operator, Tokyo Electric Power Co. (TEPCO), lowered the rod-like probe outfitted with a tong-like pinching device into the primary containment vessel of the No. 2 reactor at the crippled plant and used the machine to successfully lift pieces of the debris several centimeters.

The removal of the fuel debris is the biggest challenge in the long process of decommissioning the reactors, which will take at least three to four decades. The lifting of debris is a ray of hope in the grim battle to overcome the formidable challenge.

But the success was tempered by the fact that there were large chunks with slick surfaces the robot's pinchers were unable to grab. The probe found that deposits in various conditions lie scattered about the bottom of the vessel. Some pieces are apparently entangled in the surrounding equipment.

The images captured by the probe came as a fresh reminder of the daunting enormity of the challenge of removing all the debris.

TEPCO needs to seek steady, if slow, progress in the cleanup effort by taking one step at a time.

Tasks in and around the No. 1 to No. 3 reactors at the nuclear plant cannot be carried out by humans because of dangerously high radiation levels. Nuclear fuel in the core of these reactors overheated and melted down after towering tsunami triggered by an epic earthquake knocked out vital cooling systems on March 11, 2011.

TEPCO has made a series of attempts to use remotely controlled robots and cameras to examine the situation inside these reactors, but only small parts of the reactors' innards have been revealed so far.

Under the plan developed by the government and the utility, a small amount of debris should be removed from the No. 2 reactor in the second half of fiscal 2019, which starts in April.

Data to be collected from the operation will also offer important clues to what actually occurred inside the reactors during the catastrophic accident. TEPCO needs to study them carefully and meticulously to uncover and assemble facts.

Full-scale operations to remove debris containing melted uranium fuel from the reactors are scheduled to start in 2021.

TEPCO is responsible for identifying the make-up of the debris by using collected data and develop equipment and techniques necessary to accomplish the mission by working with related companies.

TEPCO should avoid the risk of trouble by launching full-scale debris removal operations without sufficient preparations.

The firm needs to map out reliable plans and procedures for safe and steady operations.

In doing so, the firm should not remain wedded to the traditional nuclear industry framework. It would have a better chance of achieving necessary technological innovations and breakthroughs if it pays serious attention to opinions and proposals from a wide range of companies and research institutes including those in other areas.

The experiences and expertise it accumulates through its operations at the Fukushima plant could be useful for the decommissioning of other reactors in Japan.

One big question that needs to be sorted out as TEPCO begins to remove debris is how to dispose of the molten nuclear fuel.

The Fukushima prefectural government demands that the nuclear waste from the stricken plant including debris should be eventually moved out of the prefecture.
But there has been little serious debate on specifics. Both the government and TEPCO should confront this issue head-on.

It is vital for them to offer sufficient and straightforward explanations about their efforts to tackle this problem to local governments and residents concerned while seeking to win their understanding through sincere discussions.

It is simply impossible to complete the long and tricky process of decommissioning the reactors without support from the local communities. The government and the utility should keep this firmly in mind.

March 6, 2019

A "long and bumpy" path to decommissioning

8 years on, and no quick fix in sight to reactor dismantling

http://www.asahi.com/ajw/articles/AJ201903060056.html

By CHIKAKO KAWAHARA/ Staff Writer
Time is slipping away as the government and Tokyo Electric Power Co. continue to grope with the formidable challenge of decommissioning the crippled Fukushima No. 1 nuclear plant.
Already, more than one-fifth of the 30 to 40 years estimated for the work has passed without any discernible leap forward on the issue.

“We no longer face a situation of having to quickly respond to a slew of rising problems like a whack-a-mole machine,” said a TEPCO official, referring to the aftermath of the 2011 nuclear disaster and incremental steps in progress since then.
For example, reporters decked out in full protective gear were allowed to visit the central control room for the No. 1 and No. 2 reactors in February. The room, dimly-lit, is now tidied up.
When the crisis unfolded at the plant after the Great East Japan Earthquake and tsunami hit on March 11, 2011, the room was a hive of activity with 24 people present.
Today, many gauges filling walls of the room bear signs saying “Unusable.” Figures scribbled down by technicians were left on the wall next to a water level indicator, a frantic effort to grasp of what was happening inside the No. 1 reactor’s pressure vessel after cooling systems were knocked out.
The path to decommissioning bears all the signs of being long and bumpy.
Plant operator TEPCO is tasking with finding solutions to a host of challenges to complete decommissioning, including how to remove melted nuclear fuel from the crippled reactors.
Radiation levels at the No. 1 and No. 2 reactor buildings are still too high for workers to enter. Melted nuclear fuel remains intact inside those reactors.
Retrieval of the nuclear fuel debris, which is scheduled to start in 2021, is considered to be the primary hurdle for the utility, a challenge that will determine success or failure of the overall decommissioning program.
Albeit slowly, though, conditions inside the reactors have been revealed by investigations with the use of remote-controlled probes.
A probe in the No. 2 reactor’s containment vessel in February succeeded in making "first contact" with fuel debris.
The device, not unlike a prize-grabbing crane machine at a game arcade, was able to lift pebble-like radioactive debris.
The problem is that such small melted fuel represents only a portion of the entire debris. The rest rests on the bottom of the containment vessel, and removing it from the reactor building poses immense hurdles.
Also, no decision has been made on where to store and dispose of the fuel debris even if the company manages to remove the stuff.
In the case of the No. 3 reactor, the building is now covered with a canopy to prevent radioactive substances spewing into the atmosphere. The top floor of the building blew up in a hydrogen explosion triggered by the meltdown.
Workers in protective gear are busy training for the day they start removing spent nuclear fuel from the storage pool at the No. 3 reactor building. A huge crane moves left to right when a siren sounds.
A combined 1,573 spent nuclear fuel assemblies were stored in the storage pools of the No. 1 through No. 3 reactor buildings.
Moving the fuel to somewhere safe has taken on added urgency since the buildings, already damaged by the quake, tsunami and nuclear accident, could collapse if another major temblor and tsunami strike the nuclear complex.
The transfer of all spent fuel from the No. 4 reactor building, which had been shut down before the 2011 disaster, was completed in December 2014.
But work at the No. 3 reactor building was significantly delayed by the project to install a canopy and decontaminate the structure, which took longer than expected. The crane used for the work also malfunctioned, adding to the delay.
Removing spent fuel from the No. 1 and No. 2 reactor buildings is expected to start in fiscal 2023.
Sprawling woods that existed at the nuclear complex prior to the disaster were transformed into a vacant lot for row after row of tanks storing radioactive water produced by cooling the crippled reactors.
There are now about 950 storage tanks, holding more than 1 million tons of contaminated water.
No decision has been made on how to dispose of the contaminated water although the plant is nearing its capacity to keep storage tanks on its premises.
Still, cleanup work over the past few years has freed up some space for workers on-site.

Starting from last year, workers can walk between the No. 2 and No. 3 reactor buildings in just a helmet and a simple respirator mask, gear that is considerably lighter than when radioactive levels were extremely high.
The increased mobility makes it easier for them to go about their tasks.
Radiation levels there hover at between 200 and 300 microsieverts per hour, which means workers have less than a five-minute window to take a break if they stop due to health risks.

March 7, 2019

Contaminated water and so many challenges

Nearly 1,000 water tanks are scattered across the grounds of the Fukushima No. 1 power plant. Some are over 10 meters tall, hold 1,000 to 1,200 tons and take seven to 10 days to fill. | POOL / VIA TOKYO PRESS PHOTOGRAPHERS ASSOCIATION

Eight years after triple nuclear meltdown, Fukushima No. 1's water woes show no signs of ebbing

https://www.japantimes.co.jp/news/2019/03/07/national/eight-years-triple-meltdown-fukushima-no-1s-water-woes-slow-recede/#.XIJhRLjjLyQ

by Ryusei Takahashi

Staff Writer
This is the first in a series examining how the northeast and the nation are progressing with efforts to deal with the March 2011 earthquake, tsunami and nuclear crisis.
OKUMA, FUKUSHIMA PREF. - Nearly a thousand storage tanks are scattered across the Fukushima No. 1 nuclear power plant, holding a staggering 1.1 million tons of treated water used to keep its melted reactor cores cool while they rust in the sun.

Plant manager Tokyo Electric Power Company Holdings Inc., or Tepco, plans to build more of the gigantic tanks to hold another 0.27 million tons, which is roughly the equivalent of 108 Olympic-size swimming pools. The new tanks are expected reach full capacity in four or five years.
Each tank takes seven to 10 days to fill and holds between 1,000 to 1,200 tons of liquid, Tepco officials told reporters during a tour in February organized by the Japan National Press Club. It's been eight years since Fukushima No. 1 suffered three core meltdowns triggered by tsunami following the Great East Japan Earthquake, but the situation with the tanks may be a sign Tepco has yet to get the facility under control.
"Space isn't a big issue at this point in time, but five or 10 years from now, after we've started removing the melted fuel debris, we're going to need facilities to store and preserve it," Akira Ono, president of Fukushima No. 1 Decontamination and Decommissioning Engineering Co., a Tepco unit overseeing the decommissioning process, said at a news conference in January.
The water issue is eating up both space and resources, but a solution is unlikely to emerge anytime soon.
The International Atomic Energy Agency published a report in November that said the physical constraints of the site "leave little room for additional tanks" beyond what Tepco has allocated.
The IAEA report went on to say it believes storing tainted water in "above ground tanks . . . can only be a temporary measure while a more sustainable solution is needed" and a "decision on the disposition path should be taken urgently."
Beyond 2020, Tepco has not allocated any additional space for holding treated water on the site and has no plans to do so at this time. The utility said the tanks will likely become a headache if they remain at the plant.
"At that point, we may need to rethink how we're using the space," Ono said.
Eight years ago when the monstrous tsunami hit, the entire plant lost power and reactors 1, 2 and 3 lost coolant, causing their cores to overheat. The fuel rods consequently melted, dripping molten fuel that burned through their pressure vessels and pooled in their primary containment vessels. Reactors 1, 3 and 4 then suffered hydrogen explosions.
Tepco must inject water into the reactors indefinitely to keep the melted cores cool, but water tainted by contact with the fuel and associated debris has been leaking from the damaged containment vessels and into the basements of the reactor buildings, where tons of fresh groundwater flows in daily through holes in their damaged walls.
The contaminated water is pumped out and passed through a filtration device called the Advanced Liquid Processing System — which is supposed to remove every radionuclide except for tritium — and stored in the tanks.
Tepco has taken steps to limit the amount of groundwater seeping into the reactor buildings, including wells to intercept and divert it and an underground ice wall around the buildings to block any inflow. According to Tepco, however, about 83 tons of water are seeping into the reactor buildings each day. Although this is an improvement from some 300 tons in previous years, Tepco must keep making more tanks.
At the moment, Tepco is waiting for a government panel's advice on what to do with the tritium-tainted water. The panel is considering five disposal methods: ground injection, sea discharge after diluting the tritium concentration, discharging it as steam, discharging it as hydrogen, and solidification followed by underground burial.
Tritium is a radioactive form of hydrogen that forms naturally and is a common byproduct of nuclear reactors. In large quantities, exposure can be dangerous, especially if ingested or inhaled. Processed adequately, however, tritium is believed to pose little to no health risk. For instance, tritium is present in regular tap water, but no ill effects have been confirmed, according to the Ministry of Economy, Trade and Industry.
Discharging treated tritium water into the ocean is a common practice at nuclear power plants around the world.
Thus some experts, including Toyoshi Fuketa, who heads the Nuclear Regulation Authority, think this is the best option for Fukushima.

“Prolonging the storage of water in those tanks will make decommissioning the power plant that much more difficult for Tepco. Limited resources are being used to use these tanks as storage, not just money but other resources as well,” Fuketa said at a news conference in September.
“The longer we store the water, the greater the influence it will have on the decommissioning of the Fukushima No. 1 power plant.”
But there are concerns about the impact an ocean discharge may have on fisheries still trying to recover from the nuclear crisis.
Fishing in the area has resumed on a trial basis and workers still perform radiation checks before shipping their hauls to fish markets. The waters off Fukushima Prefecture are at the confluence of two ocean currents — the Oyashio from the north and Kuroshio from the south — which make for the good fishing grounds that have been a vital part of the agrarian prefecture’s economy.
Eight years after the meltdowns, however, residents are still struggling to convince the world that fish from the area are safe to eat. Many believe public perception alone will cripple Fukushima’s fishing industry anew if the tainted water is expelled into the ocean — even if the tritium has been reduced to below international standards.
Trust issues continue to plague Tepco after it claimed ALPS was filtering every radionuclide from the cooling water except tritium. Last August it came to light that the allegedly treated water still contained other dangerous contaminants, including iodine, cesium and strontium. Some of the concentrations were above current safety limits.
This has further angered Fukushima residents and made it harder to get their approval for dumping the water held by the tanks into the sea.
During a public hearing hosted by METI in August, participants urged the government and Tepco to consider finding an off-site location to store the water instead of discharging it into the ocean.
“Without a national debate and without the understanding of Japanese citizens or the countries importing our products, as a fisherman of Fukushima Prefecture, I strongly oppose the plan to discharge the treated water into the ocean,” Tetsu Nozaki, chairman of the Fukushima Prefectural Federation of Fisheries Cooperative Association, told the hearing.
“To release the ALPS-treated water into the ocean, at this time, would deal a disastrous blow to the fishermen of Fukushima and rob them of their hard work and motivation,” he said.
Thierry Charles, deputy director-general in charge of nuclear safety at the Radioprotection and Nuclear Safety Institute in France, admitted it is a difficult problem to address, given the volume of water concerned and the tritium content.
Charles believes a controlled release into the ocean would be viable “under conditions to be defined.”
“In this respect, the societal acceptance of this solution should be based on the broad involvement of all stakeholders at the various stages of the process, by explaining the different options studied,” he told The Japan Times.
Meanwhile, the crippled plant faces other serious challenges — including how to extract the molten fuel.
“How we remove the melted fuel debris from the reactors. That’s the most important point. . . . The water tanks are not a big problem,” said Hiroshi Miyano, a professor at Hosei University’s Graduate School of Engineering and Design and chair of the decommissioning committee of the Atomic Energy Society of Japan.
In February, Tepco inserted a remote-controlled probe into reactor 2 to make contact with material inside the containment vessel believed to be melted fuel. The machine — equipped with a camera, thermometer and dosimeter — was designed to poke and gently lift sediment to test its physical properties.
This was the first time a machine had touched melted fuel debris inside any of the crippled reactors at Fukushima No. 1.
The removal process at the plant is slated to begin in 2021. Before that part begins, though, research from the site will be used to make various remote-controlled probes capable of navigating the unique scenarios in each unit. Reactor 3, for example, remains largely submerged and requires an aquatic probe.

Miyano said Tepco and the government — with the help of scientists, nuclear physicists and engineers from around the world — are inventing new technologies as they devise a way to remove the debris. He added that no country has ever attempted to use remote-controlled robots to remove melted fuel from the inside of a crippled nuclear reactor.
“This is the first time, so there will be many challenges.”

March 8, 2017

Fukushima's water woes

8 years on, water woes threaten Fukushima cleanup

http://www.asahi.com/ajw/articles/AJ201903080035.html

REUTERS
OKUMA, Fukushima Prefecture--Eight years after the Fukushima nuclear crisis, a fresh obstacle threatens to undermine the massive clean-up: 1 million tons of contaminated water must be stored, possibly for years, at the power plant.
Last year, Tokyo Electric Power Co said a system meant to purify contaminated water had failed to remove dangerous radioactive contaminants.
That means most of that water--stored in 1,000 tanks around the plant--will need to be reprocessed before it is released into the ocean, the most likely scenario for disposal.
Reprocessing could take nearly two years and divert personnel and energy from dismantling the tsunami-wrecked reactors, a project that will take up to 40 years.
It is unclear how much that would delay decommissioning. But any delay could be pricey; the government estimated in 2016 that the total cost of plant dismantling, decontamination of affected areas and compensation, would amount to 21.5 trillion yen ($192.5 billion), roughly 20 percent of the country's annual budget.
TEPCO is already running out of space to store treated water. And should another big quake strike, experts say tanks could crack, unleashing tainted liquid and washing highly radioactive debris into the ocean.
Fishermen struggling to win back the confidence of consumers are vehemently opposed to releasing reprocessed water--deemed largely harmless by Japan's nuclear watchdog, the Nuclear Regulation Authority (NRA)--into the ocean.
"That would destroy what we've been building over the past eight years," said Tetsu Nozaki, head of the Fukushima Prefectural Federation of Fisheries Co-operative Associations. Last year's catch was just 15 percent of pre-crisis levels, partly because of consumer reluctance to eat fish caught off Fukushima.

SLOW PROGRESS
On a visit to the wrecked Fukushima No. 1 nuclear power plant last month, huge cranes hovered over the four reactor buildings that hug the coast. Workers could be seen atop the No. 3 building getting equipment ready to lift spent fuel rods out of a storage pool, a process that could start next month.
In most areas around the plant, workers no longer need to wear face masks and full body suits to protect against radiation. Only the reactor buildings or other restricted areas require special equipment.
Fanning out across the plant's property are enough tanks to fill 400 Olympic-sized swimming pools. Machines called Advanced Liquid Processing Systems, or ALPS, had treated the water inside them.

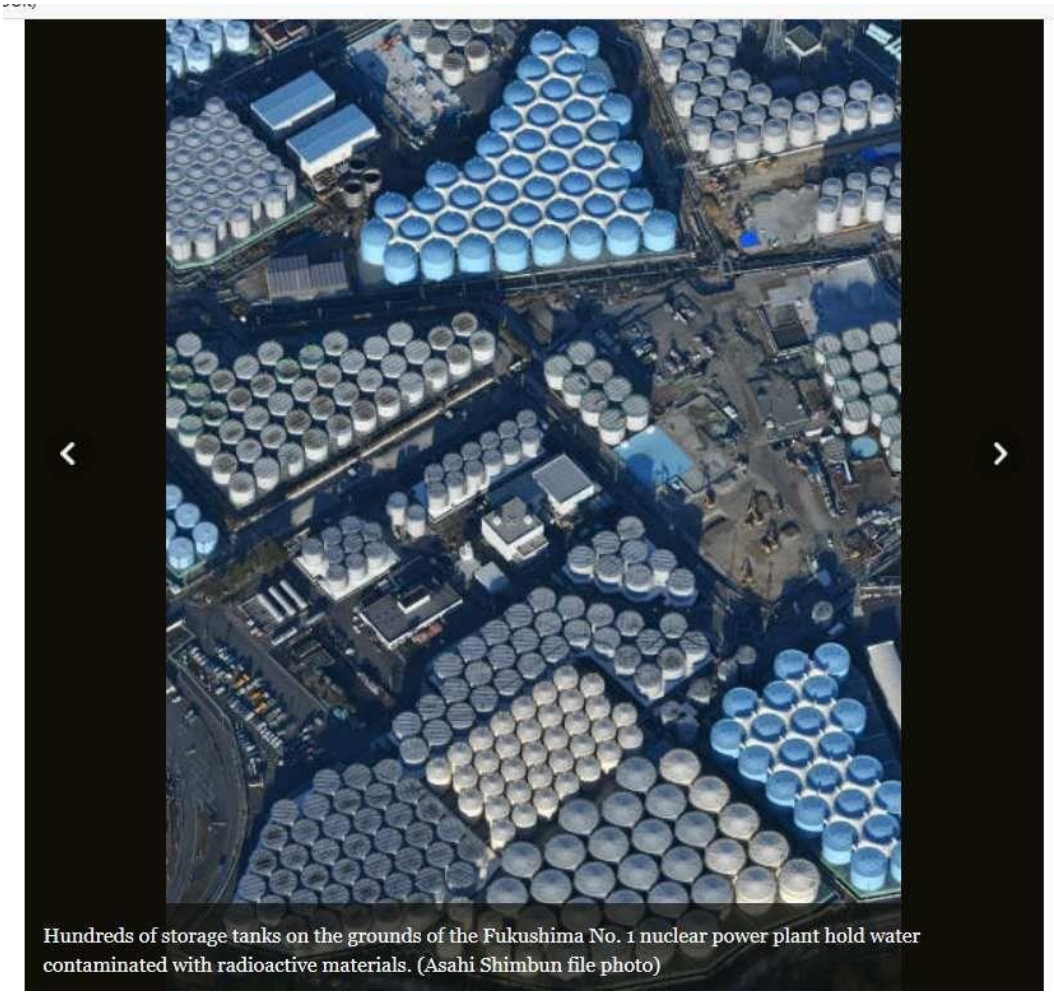
TEPCO said the equipment could remove all radionuclides except tritium, a relatively harmless hydrogen isotope that is hard to separate from water. Tritium-laced water is released into the environment at nuclear sites around the world.
But after newspaper reports last year questioned the effectiveness of ALPS-processed water, TEPCO acknowledged that strontium-90 and other radioactive elements remained in many of the tanks.
TEPCO said the problems occurred because absorbent materials in the equipment had not been changed frequently enough.
The utility has promised to re-purify the water if the government decides that releasing it into the ocean is the best solution. It is the cheapest of five options a government task force considered in 2016; others included evaporation and burial.
TEPCO and the government are now waiting for another panel of experts to issue recommendations. The head of the panel declined an interview request. No deadline has been set.
NRA chief Toyoshi Fuketa believes ocean release after dilution is the only feasible way to handle the water problem. He has warned that postponing the decision indefinitely could derail the decommissioning project.

STORING INDEFINITELY

Another option is to store the water for decades in enormous tanks normally used for crude oil. The tanks have been tested for durability, said Yasuro Kawai, a plant engineer and a member of Citizens' Commission on Nuclear Energy, a group advocating abandoning nuclear energy.
Each tank holds 100,000 tons, so 10 such tanks could store the roughly 1 million tons of water processed by ALPS so far, he said.
The commission proposes holding the tritium-laced water, which has a half life of 12.3 years, in tanks for 123 years. After that, it will be one thousandth as radioactive as it was when it went into storage.
Although experts caution that tanks would be vulnerable to major quakes, Japan's trade and industry minister, Hiroshige Seko, said the committee would consider them anyway.
"Long-term storage ... has an upside as radiation levels come down while it is in storage. But there is a risk of leakage," Seko told Reuters. "It is difficult to hold the water indefinitely, so the panel will also look into how it should be disposed of eventually."
Space is also a problem, said Akira Ono, TEPCO's chief decommissioning officer. By 2020, the utility will expand tank storage capacity by 10 percent to 1.37 million tons, and about 95 percent of total capacity will probably be used by the end of that year, he said.
"Tanks are now being built on flat, elevated spots in stable locations," Ono said. But such ideal space is getting scarce, he added.
Many local residents hope TEPCO will just keep storing the water. If it does get released into the ocean, "everyone would sink into depression," said fishing trawler captain Koichi Matsumoto.
Fukushima was once popular with surfers. But young people in the area do not go surfing any more because they've been repeatedly warned about suspected radioactivity in the water, said surf shop owner Yuichiro Kobayashi.
Releasing treated water from the plant "could end up chasing the next generation of children away from the sea as well," he said.
Ono says dealing with contaminated water is one of many complex issues involved in decommissioning.
A year ago, when he took over leading the effort, it felt like the project had just "entered the trailhead," he said. "Now, it feels like we're really starting to climb."

March 19, 2019

1 million tons and counting



Hundreds of storage tanks on the grounds of the Fukushima No. 1 nuclear power plant hold water contaminated with radioactive materials. (Asahi Shimbun file photo)

Fukushima water headache: 1 million tons and counting

http://www.asahi.com/ajw/articles/AJ201903190042.html

The crippled Fukushima No. 1 nuclear plant reached an undesired milestone on March 18: Storage tanks at the site now contain more than 1 million tons of radiation-contaminated water.

The announcement by the plant's operator, Tokyo Electric Power Co., came as the utility and the central government continue to weigh water-disposal methods while hearing the concerns of fishermen who fear for their livelihoods.

Toyoshi Fuketa, chairman of the Nuclear Regulation Authority, has repeatedly said a decision must be made soon on how to deal with the contaminated water.

"We are entering a period in which further delays in deciding what measure to implement will no longer be tolerable," Fuketa recently said.

Groundwater becomes contaminated when it flows into the buildings of the three reactors that suffered meltdowns in 2011 following the Great East Japan Earthquake and tsunami. Water that is

used to cool the nuclear fuel debris is processed to remove radioactive substances, but the system cannot get rid of tritium.
These problems have forced TEPCO to store the contaminated water in hundreds of tanks installed at the Fukushima plant.
If more storage tanks are constructed, the overall capacity of 1.37 million tons at the site will likely be reached by the end of 2020.
Fukushima fishermen are already on alert for the one option they have already criticized--diluting the water and dumping it into the Pacific Ocean.
The economy ministry in 2016 said that measure could be implemented in the shortest time frame and at a low cost.
Fuketa has also said this is the most realistic option, but he noted that it would require years of preparation.
Some experts said the go-ahead for the dilution measure should have been given at the end of 2018 to start the process before the storage tanks reach capacity.
Economy ministry officials tried to explain various measures being considered at a public hearing in Fukushima in August 2018, including releasing the diluted water into the ocean.
“It will have a devastating effect on fishing in Fukushima,” said Tetsu Nozaki, who heads the Fukushima prefectural federation of fisheries cooperative associations.
Fukushima fishermen have slowly resumed operations since all forms of fishing were prohibited after high levels of radiation were found in fish caught off the Fukushima coast.
Fish auctions restarted at Fukushima ports in spring 2017, but the volume of fish brought in is still only about 20 percent of levels before the 2011 nuclear accident.
The last thing Fukushima fishermen want is an increase of negative publicity about their catches if the diluted water is dumped into the Pacific.
The government has spent about 34.5 billion yen ($309 million) to build a frozen underground earth wall around the three reactor buildings to divert the groundwater to the ocean. The “ice wall” has cut down the flow of groundwater, which at one time reached about 500 tons a day.
But still, groundwater continues to flow into the three reactor buildings at a rate of about 100 tons daily.
(This article was compiled from reports by Chikako Kawahara, Hiroshi Ishizuka, Toshio Kawada and Kazumasa Sugimura.)

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