

Who Will Take the Radioactive Rods from Fukushima?

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Global Research, May 31, 2011

[4th Media Beijing](#) 30 May 2011

Region: [Asia](#)

Theme: [Environment](#)

The decommissioning of the Fukushima 1 nuclear plant is delayed by a single problem: Where to dispose of the uranium fuel rods? Many of those rods are extremely radioactive and partially melted, and some contain highly lethal plutonium.

Besides the fissile fuel inside the plant's six reactors, more than 7 tons of spent rods have to be removed to a permanent storage site before workers can bury the Fukushima facility under concrete. The rods cannot be permanently stored in Japan because the country's new waste storage centers on the northeast tip of Honshu are built on unsuitable land. The floors of the Rokkasho reprocessing facility and Mutsu storage unit are cracked from uneven sinking into the boggy soil.

Entombment of the rods inside the Fukushima 1 reactors carries enormous risks because the footing of landfill cannot support the weight of the fuel rods in addition to the reactors and cooling water inside the planned concrete containment walls. The less reactive spent fuel would have to be kept inside air-cooled dry casks. The powerful earthquakes that frequently strike the Tohoku region will eventually undermine the foundations, causing radioactive wastewater to pour unstopably into the Pacific Ocean. The rods must therefore go to another country.

American Bad Faith

Under the Non-Proliferation Treaty (NPT), signed by Japan in 1970, Washington's negotiators stipulated that used nuclear fuel from Japanese reactors must by law be shipped to the United States for storage or reprocessing to prevent the development of an atomic bomb. Washington has been unable to fulfill its treaty obligations to Tokyo due to the public outcry against the proposed Yucca Mountain storage facility near Las Vegas.

A panel convened by the Obama administration has just recommended the set up of a network of storage sites across the United States, a controversy certain to revive the anti-nuclear sentiments during the upcoming election campaign. The American nuclear industry has its own stockpile of more than 60,000 tons of spent fuel - not counting waste from reactors used for military and research purposes - leaving no space for Fukushima's rods inside the Nevada disposal site, if indeed it is ever opened.

To Continental Asia

The Tokyo Electric Power Company (Tepco) has allocated 1 trillion yen (\$12 billion) in funds for nuclear waste disposal. Areva, the French nuclear monopoly, has teamed up with Tepco to find an overseas storage site. So far, the Tepco-Areva team have quietly contacted three

Asian countries – Kazakhstan, China and Mongolia — to set up a center for “reprocessing”, a euphemism for nuclear dump site.

Among the threesome, China was the top choice for the Japanese nuclear establishment, which has confidence in Beijing’s ability to safeguard nuclear secrets from its citizenry and even from the top leaders. Japan’s space agency, which keeps 24-hour satellite observation over every nuclear-related facility in China, possesses the entire record of radiation leaks there. Since Beijing withholds this sort of data from the public, the Japanese side felt it had the necessary leverage in talks with Chinese nuclear officials.

Though the nuclear-sector bureaucrats were initially eager to receive bundles of yen, the proposal was blown away by the salt craze that swept over China. Within a couple of weeks of the Fukushima meltdowns, millions of shoppers emptied supermarket shelves on rumors that iodized salt could prevent radiation-caused thyroid cancer. The Chinese public is rightfully fearful of health-related scandals after discoveries of melamine in milk, growth hormones in pork, pesticides in vegetables, antibiotics in fish and now radioactive fallout over farmland.

A nuclear disposal deal would require trucks loaded with radioactive cargo to roll through a densely populated port, perhaps Tianjin or Ningbo, in the dead of night. There is no way that secret shipments wouldn’t be spotted by locals with smart phones, triggering a mass exodus from every city, town and village along the route to the dumping grounds in China’s far west. Thus, the skittishness of the ordinary Chinese citizen knocked out the easiest of nefarious plans.

Principle of Industrial Recovery

A more logical choice for overseas storage is in the sparsely populated countries that supply uranium ore to Japan, particularly Australia and Canada. As exporters of uranium, Canberra and Ottawa are ultimately responsible for storage of the nuclear waste under the legal principle of industrial recovery.

The practice of industrial recovery is already well-established in the consumer electronics and household appliances sectors where manufacturers are required by an increasing number of countries to take back and recycle used television sets, computers and refrigerators.

Under the principle, uranium mining giants like Rio Tinto and CAMECO would be required to take back depleted uranium. The cost of waste storage would then be factored into the export price for uranium ore. The added cost is passed along to utility companies and ultimately the consumer through a higher electricity rate. If the market refuses to bear the higher price for uranium as compared with other fuels, then nuclear power will go the way of the steam engine.

Australian and Canadian politicians are bound to opportunistically oppose the return of depleted uranium since any shipments from Fukushima would be met by a massive turnout of “not-in-my-backyard” protesters. The only way for Tokyo to convince the local politicians to go along quietly is by threatening to publish an online list of the bribe-takers in parliament who had earlier backed uranium mining on behalf of the Japanese interests.

Nuclear’s Cost-Efficiency

The question then arise whether nuclear power, when long-term storage fees are included, is competitive with investment in renewable energy such as wind, solar, hydro and tidal resources. Renewable energy probably has the edge since they don't create waste. Natural gas remains the undisputed price beater wherever it is available in abundance. In a free market without hidden subsidies, nuclear is probably doomed.

In a lapse of professionalism, the International Atomic Energy Commission (IAEA) has never seriously addressed nuclear-waste disposal as an industrywide issue. Based on the ration of spent rods to reactor fuel inside U.S. nuclear facilities, there are close to 200,000 metric tons of high-level nuclear waste at the 453 civilian nuclear-energy plants worldwide. Yet not a single permanent storage site has ever been opened anywhere.

The Fukushima 1 dilemma shows that the issues of cost-efficiency and technological viability can no longer be deferred or ignored. Ratings agencies report that Tepco's outstanding debt has soared beyond \$90 billion, meaning that it cannot cover future costs of storing spent rods from its Kashiwazaki and Fukushima 2 nuclear plants. The Japanese government's debt has soared to 200 percent of GDP. Neither entity can afford the rising cost of nuclear power.

The inability of Tepco or the government to pay for nuclear waste disposal puts the financial liability squarely on its partner companies and suppliers, including GE, Toshiba, Hitachi, Kajima Construction and especially the sources of the uranium, CAMECO and Rio Tinto and the governments of Canada and Australia. A fundamental rule of both capitalism and civil law is that somebody has to pay.

Last Stop

Since Australia and Canada aren't in any hurry to take back the radioactive leftovers, that leaves Japan and treaty-partner United States with only one option for quick disposal-Mongolia.

Ulan Bator accepts open-pit mining for coal and copper, which are nothing but gigantic toxic sites, so why not take the melted-down nuclear rods? Its GDP, ranked 136 among the world's economies, is estimated to be \$5.8 billion in 2010. Thus, \$12 billion is an unimaginable sum for one more hole in the ground.

Not that Mongolia would get the entirety of the budget, since the nuclear cargo would have to transit through the Russian Far East. Unlike the health-conscious Chinese, the population of Nakhodka or Vladivostok are used to playing fast-and-loose with radioactive materials and vodka.

Even if the mafia that runs the Russian transport industry were to demand a disproportionate cut, Mongolia's 3 million inhabitants would be overjoyed at gaining about \$2,000 each, more than the average annual income, that is if the money is divided evenly after the costs of building the dump.

Realistically, the Mongolian people are unlikely to receive a penny, since the money will go into a trust fund for maintenance costs. That's because \$12 billion spread over the half-life of uranium - 700 million years - is equivalent to \$17 in annual rent. That doesn't even cover kibble bits for the watchdog on duty, much less the cooling system. Not that anyone will be counting since by the time uranium decays to a safe level, fossils will be the sole remnant of human life on Earth.

Illusory, shortsighted greed will surely triumph in Mongolia, and that leaves a question of moral accountability for the rest of us. Will the world community feel remorse for dumping its nuclear mess onto an ancient culture that invented boiled mutton, fermented mare's milk and Genghis Khan? For guilt-ridden diplomats from Tokyo and Washington wheedling the dirty deal in Ulan Bator, here's the rebuttal: Did the national hero, the Great Khan, ever shed any tears or feel pangs of guilt? There's no need for soul-searching. A solution is at hand.

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