

found in the residues of burnt uranium. The Americans would say to us that they might not offer their uranium enrichment services unless we promised to use plutonium.”

Perhaps the Japanese have realized that the world has changed and that today, insanity reigns among those who hold world power.

By not using plutonium as one of the largest reserves of safe and cheap energy, the world will be sabotaging the peaceful use of nuclear energy, making it uneconomical by limiting its energy efficiency and by favoring an unnecessary increase in radioactive waste represented by these spent and un-recycled fuel elements.

This is apparently the goal of those obscurantist “druids” of the international anti-nuclear cult, such as Franz Berkhout et al., who authored an article in the November 1992 issue of the *Bulletin of the Atomic Scientists* stating that “the first priority is not to figure out ways to make weapons plutonium work in the civilian power cycle. Rather, the first priority must be to keep plutonium, weapons-grade and reactor-grade, out of the hands of would-be bomb makers. . . . An obvious alternative . . . is to mix plutonium back into the high-level waste that was generated when the plutonium was originally separated. . . . Mixing plutonium with high-level waste glass would make plutonium recovery impossible.”

Dr. Ray: Plutonium is a valuable resource

by Marjorie Mazel Hecht

In the Atoms for Peace days of the 1960s, it was taken for granted that the nuclear fuel cycle would be completed, so that spent fuel from nuclear reactors would be reprocessed to be used again as fuel. This would turn 96% of the so-called nuclear waste into a valuable resource, at the same time eliminating the need to store or bury radioactive spent fuel. Plutonium was considered an essential part of the fuel cycle in these optimistic days of the nuclear age; it would ensure an endless, renewable source of energy because breeder reactors could be designed to produce more plutonium than they burned.

Over the course of the last 30 years, however, plutonium developed an “image problem,” to quote Dr. Dixy Lee Ray, who devoted the last several years to fighting for science-based policies regarding energy and the environment. Ray frequently discussed the plutonium question in the months before her death in January 1994, and she was working on a feature article on the subject for *21st Century Science & Technology* magazine. Her view was unequivocal: With appropriate safeguards, the best way to dispose of plutonium was to use it! Ray advocated the development of advanced reactors that could burn plutonium and the use of existing light water reactors to burn mixed oxide fuel.

Ray did not live to complete the plutonium article, but *21st Century* was able to publish an earlier piece Ray wrote on plutonium in its Summer 1994 issue. Ray had written the earlier article in 1988 as the keynote address for a meeting of the International Nuclear Materials Management organization in Las Vegas. As the head of the U.S. Atomic Energy Agency from 1973-75, Ray knew the nuclear issue inside out. Equally important, she had the courage to stand up and fight for nuclear science and technology against both the misguided environmentalists and the misguided members of the nuclear community who preferred to accommodate to the anti-nuclear forces, no matter how irrational their demands.

Putting toxicity into perspective

Ray discusses the properties of plutonium, the history of its use, and the process of political fighting and fear that led President Carter to stop reprocessing of spent nuclear fuel, thus stopping the use of plutonium.

She wrote: “Plutonium is often called ‘the most toxic

U.S. environmental groups were given millions of dollars in the past five years to spread scare stories about a man-made ozone hole that would cause cancer on Earth.

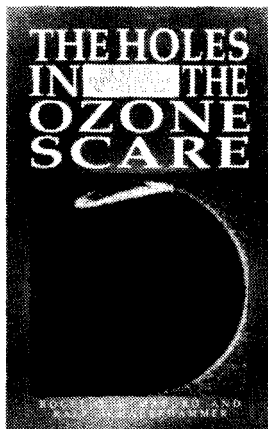
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substance known to man,' 'toxic beyond human experience,' the 'fearsome fuel,' and other such melodramatic nonsense.

"Of course plutonium is toxic. Of course it must be handled with care. But the rest is just horror propaganda. Plutonium is primarily an alpha emitter, which means that its radiation is absorbed in the air after a few inches, and a sheet of paper is sufficient to shield oneself against its radiation at close quarters. It is far from being the most toxic substance known to man. When eaten or absorbed in the blood stream, it is 10 times less toxic than lead arsenate and hundreds of thousands of times less toxic than some biological poisons such as diphtheria or botulism toxin.

"However, though ingestion of plutonium or its absorption through the skin is dangerous, the real danger of plutonium is breathing it in the form of fine dust particles. Plutonium is essentially insoluble in water, and fine particles may stay long in the lung, with the possibility of causing lung cancer.

"This has been extensively investigated, and the experimental evidence is overwhelming: Not a single human cancer has ever been positively associated with exposure to plutonium. During the national emergency conditions of the early nuclear weapons industry, the exposures to plutonium far exceeded the present maximum permissible limits. Yet, of 17,000 plutonium workers, including those associated with the Manhattan Project, not one has died of or developed plutonium-related health problems.

"Included in this figure are 25 plutonium workers from Los Alamos (1944-1945) who had 25 times the currently permissible amount of plutonium deposited in their lungs. According to critics' estimates of lung damage, these 25 workers should have developed 1,500 individual lung cancers. In fact, out of the 25 workers, 23 are alive and in good health, and 2 died recently—one in an automobile accident and the other from a heart condition.

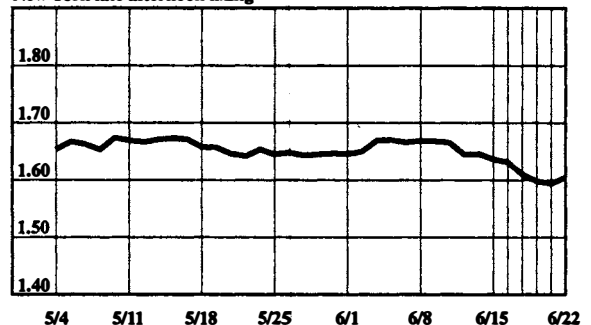
"Of all the materials that have emerged since the dawn of the nuclear age, it is probable that none has been subject to so much controversy as that 95th element in the periodic table, the transuranic metal plutonium. From those who claim that it is the most toxic substance known, to those who see only its military use in warheads, and the many opponents who would like nothing better than to have it stuffed back into some genie's bottle, plutonium has suffered something of an image problem. Perhaps its name also contributes to its bad press. But it was not named for Pluto, the god of the underworld or Hades, but for Pluto, the second planet beyond Uranus in the heavenly firmament. It is an extraordinary resource, like no other. Its promise, its guarantee, is essentially unlimited energy; but will we use it?"

There was no question for her that the consequence of not using plutonium would damn not only the United States, but the rest of the world as well. As she put it, "Should we turn our backs on the use of plutonium as a fuel for generating electricity, we will deny abundant energy, not only to ourselves, but to coming generations as well."

Currency Rates

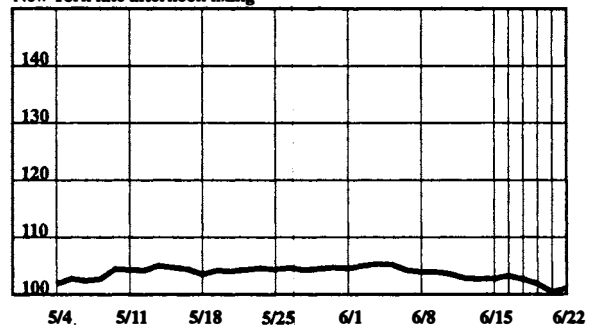
The dollar in deutschemarks

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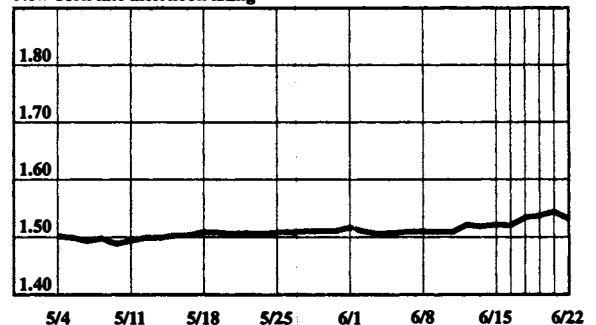
The dollar in yen

New York late afternoon fixing



The British pound in dollars

New York late afternoon fixing



The dollar in Swiss francs

New York late afternoon fixing

