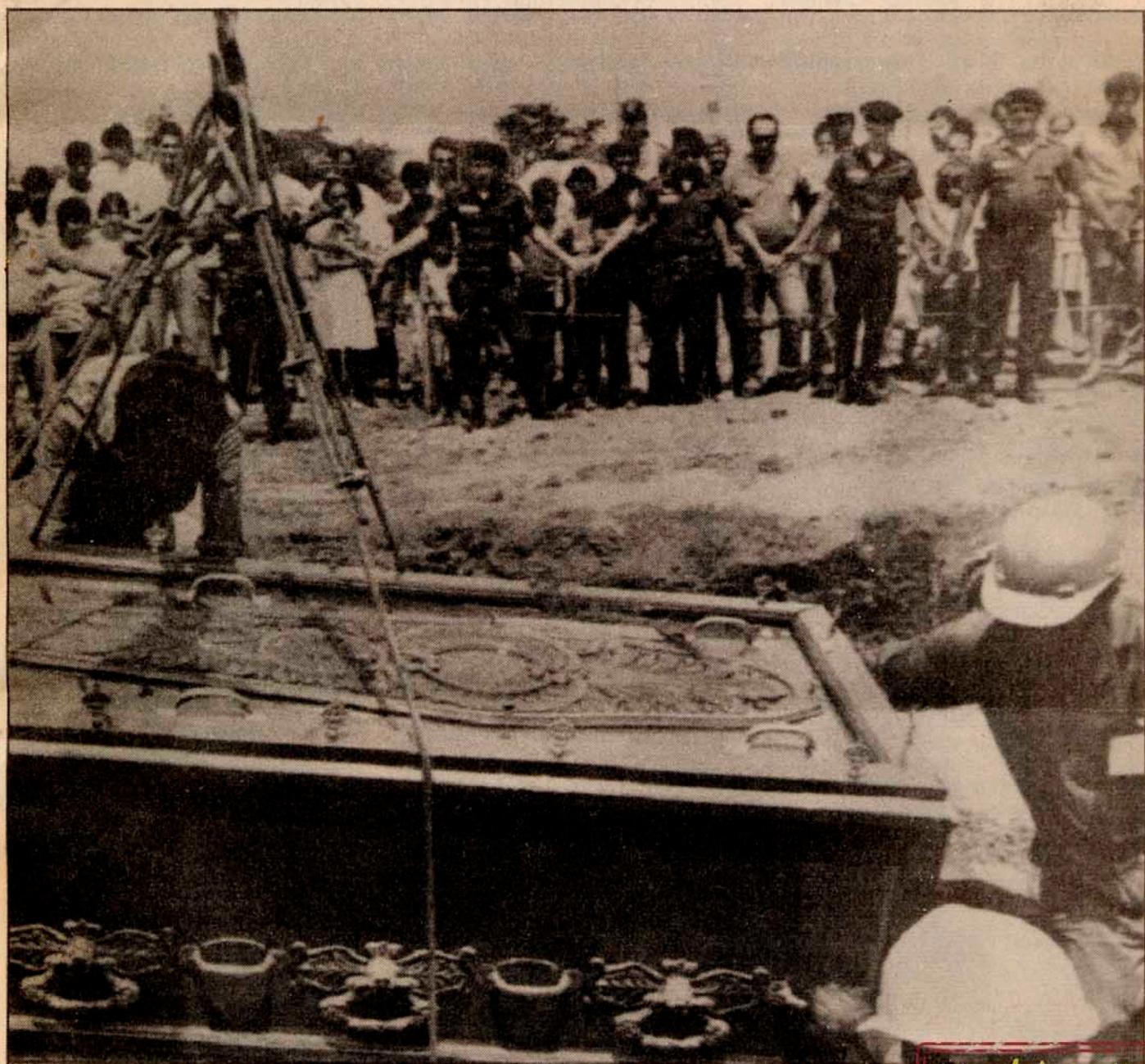


radioactive waste
campaign

RWC Waste Paper

Winter 1987/1988



Military guards hold back people watching the lead-lined casket burial of Israel dos Santos, a victim of a major nuclear accident in Brazil. See story on page 3.

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UPDATE

South African Uranium Shipment Enters U.S.

By John Miller

Loopholes in U.S. anti-apartheid legislation were large enough to permit tons of processed uranium from Southern Africa to enter the U.S. in October. In a byzantine series of transactions involving five countries, some 20 tons of uranium arrived in Washington State to be manufactured into nuclear plant fuel rods.

The shipment took advantage of a loophole in U.S. anti-apartheid law which, while banning importation of uranium yellowcake, does not prohibit South African or Namibian uranium that has been processed abroad.

According to a confidential letter to the U.S. Nuclear Regulatory Com-

The U.S., Britain, the U.S.S.R. and others each played a part in moving illegally-mined ore.

mission obtained by the British newspaper the *Sunday Observer*, the October shipment was converted into uranium hexafluoride by British Nuclear Fuels Ltd. and then sent to the Soviet Union, where it was enriched. After that, it went to Richland, Washington, to be manufactured into fuel rods at the Advanced Nuclear Fuels fabrication plant, a subsidiary of Siemens. The rods were ordered by a West German utility, Rheinisch-Westfälisches Elektrizitätswerk, for use in its nuclear reactors.

According to the *Observer*, the letter to the Nuclear Regulatory Commission certifies that the processed uranium is "a product which has not been produced or manufactured in South Africa," therefore falling within U.S. law. There are no British re-

strictions on handling South African uranium. France processes Southern African uranium, as well.

The West German newspaper, *Die Tageszeitung*, quotes an affidavit by Charles Malody, manager of Advanced Nuclear Fuels, as saying "the Siemens subsidiary plans to import approximately 20 tons of the concentrated uranium hexafluoride, which originated in South Africa." Another document specifically mentions the German utility as the buyer, "South Africa as the source and Russia as the place where it was processed."

When the uranium was shipped from South Africa is unclear. *Die Tageszeitung* says the German utility disputes that the uranium was "gotten out of South Africa and Namibia at the present time." A German company, STEAG of Hessen, sold the uranium to the power company, and its spokesperson claims that the company never delivered any uranium from Southern Africa to Britain. Wolfgang Byer, a spokesperson for Advanced Nuclear Fuel's parent company, told the German newspaper that "ANF has no influence as to the origin of the uranium. The contractor or company makes fuel rods for the nuclear plants, who are the suppliers of uranium for their respective plants."

In order to evade Soviet contract language against uranium from Namibia and South Africa, the German nuclear utility may have had its uranium enriched under an old contract without such language. Why the Soviets would want to work under an old contract is not known.

According to Seattle anti-apartheid activist Tom Buchanan, who obtained many of the documents, the 20 tons is only part of the total uranium shipment of 167 tons from South Africa to be processed into fuel rods at the Richland, Washington facility.

In testimony before the Seattle Ports Commission, Buchanan of the Inland Waters Coalition called the

shipments of uranium hexafluoride "both illegal and dangerous." He pressed for public hearings on the shipments. Outside the Commission meeting, University of Washington Students Against Apartheid built a

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rwc Waste Paper

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The Radioactive Waste Campaign promotes greater public awareness of the dangers to human health and the biosphere from the generation of radioactive waste. The Campaign's programs include research, information dissemination and public education.

Nuclear Tragedy Strikes Brazil

By Gail Daneker and Jennifer Scarlott

It is a bizarre, fantastic tragedy straight out of the writings of a Gabriel Garcia Marquez or an Isabel Allende; but it is not fiction.

In September, the worst nuclear accident since Chernobyl occurred in the central Brazilian city of Goiania. Four people are dead of radiation poisoning; 245 received some emissions; 44 are seriously contaminated and hospitalized; and hundreds may develop leukemia or other forms of cancer.

Goiania is a rapidly expanding agricultural center about 120 miles southeast of Brasilia. It is a place of contrasts, of skyscrapers and shacks. It has wealthy residents, and it also has people who make their living scavenging and trashpicking.

On September 13, Roberto Santos Alves, 22 and a friend came across a large piece of equipment in an abandoned, crumbling medical clinic. They sold the machine to their friend Devair Alves Ferreira, a scrap-metal dealer, for \$30.

Intrigued by the weight of a lead cylinder inside the machine, the dealer and others broke it open. Inside was a brilliant blue powder which enchanted Ferreira, his friends and family. They admired the strange, glowing material and passed it around. Ferreira's brother took a small lump home. His six-year-old niece Leide played with the magic powder, even swallowing some when she ate with her contaminated hands. A friend of Santos Alves placed a small fragment in his pocket to make into a ring for his wife.

Ten minutes after eating, Leide began vomiting. She and several others were probably exposed to twice or more the dose of 500 to 600 rems considered lethal for adults. It took several days for local doctors to rule out tropical diseases and to

properly diagnose radiation sickness.

Leide is now dead. So is her aunt, Ferreira's wife. Ferreira himself is not expected to live. Santos Alves' right forearm was amputated and he is in critical condition. His friend suffered burns on his right thigh and is among those most seriously ill.

On that day in September, the impoverished friends and family of a scrap-metal dealer unwittingly opened a twentieth century Pandora's box. The cylinder was part of an unused machine for the treatment of cancer patients, abandoned when the privately-owned Goiania Institute for Radiology moved.

The iridescent blue powder was cesium-137. Cesium-137 is a highly radioactive substance which takes about 30 years to lose half its strength, and 300 years or so for its radiation to reach non-hazardous levels. It is employed commercially, generally in the form of powder or pellets, to give radiation doses to cancer patients, irradiate food, gauge the density of welds, and in a host of other ways in industry.

A byproduct of the operation of nuclear power reactors, cesium-137 was one of the lethal substances released by the Chernobyl accident. Three and one half ounces, approxi-



Photo by Agence France-Presse

Israel dos Santos, a junkyard worker from Goiania, Brazil, who helped break open a capsule containing cesium-137. He is seen at his hospital window speaking with reporters in this early October photo. Dos Santos, the third victim of the radiation incident, died on October 27.

Gail Daneker, who co-founded the Campaign for Peace and Democracy/East and West, is a long-time peace and environmental activist. **Jennifer Scarlott** is Assistant Director of the Lawyers Committee on Nuclear Policy.

mately the total amount of cesium fallout over West Germany following the 1986 accident, was in the Goiania container.

Two weeks elapsed before federal authorities learned of the contamination and they proved ill-equipped to deal with the crisis. Technicians from the National Commission on Nuclear Energy (CNEN) arrived without protective clothing and with inadequate measuring equipment. It took two more weeks to map out the contaminated areas: 11 residential areas were closed off and evacuated. Radiation at certain sites remains so high that it will have to be removed by robots. The total clean-up may take more than six months.

The victims themselves were radioactive, which significantly complicated their treatment. Two nurses and a doctor became contaminated from exposure to their patients. The

victims' blood, urine, bed sheets and clothing had to be handled as radioactive waste.

An international medical team helped save two victims through the use of a new, experimental drug. Those who received the highest

half-ton coffins lined with a layer of lead were lowered by cranes into a joint grave encased with concrete.

Residents haunted by the fear of radioactivity are also confronting the spectre of economic disaster. Fear of contamination has caused both people and products from the city of Goiania and the entire state of Goias to be shunned by the rest of the country. An international trade fair held in Rio de Janeiro in November banned products from Goias. Brazil's largest herd of cattle grazes outside the city. If people come to believe the meat is contaminated, the economic repercussions could be enormous. A city council member has noted that already "Sales of state products are down almost 50 percent."

Critics of the government's nuclear policies and programs have harshly condemned authorities for being ill-prepared and incompetent. It has been noted that Brazil's 1400 radiotherapy machines are virtually unmonitored and unregulated. Critics also point out that the radiation equipment discovered by the scavengers had been abandoned for three years.

Brazil's National Commission on Nuclear Energy, CNEN, is responsible for monitoring and licensing all sources of radioactivity. The Commission has come under particularly harsh criticism. Like the former Atomic Energy Commission in the United States, the Commission has the contradictory roles of supervisor and promoter of nuclear energy. Not surprisingly, it emphasizes the latter.

The *Washington Post* quoted leading Brazilian physicist Jose Goldemberg as saying "I've proposed separating the responsibilities but the government hasn't moved. I'm surprised it hasn't but there is lots of resistance to restructuring the commission, which has many links to the military as well as other powerful ties."

Federal and state agencies are frantically passing the buck for who is to blame for the accident. To date, the three doctors who abandoned the irradiation machine, the CNEN director of nuclear installations, and the coordinator for health inspection for Goias have been indicted.

The mishandling by Brazilian officials of this disaster is highly reminiscent of the accident "management" by governments which have been in-

The victims themselves were radioactive, which significantly complicated their treatment.

doses of cesium-137 died from drastically weakened immune systems which allowed viruses to invade their bodies. Others who received lower dosages may die more slowly from cancer. In the year that it takes for a human body to cleanse itself of cesium particles, enormous harm can be done as those particles continue to emit deadly gamma radiation. Many victims suffered the classic symptoms of radiation sickness: vomiting, burns, hair loss, internal lesions and hemorrhaging.

The government is now confronted with the prodigious task of disposing of tons of nuclear waste, a procedure complicated by the fact that despite its ambitious nuclear program, Brazil has no permanent waste disposal site. In the aftermath of the accident, all of Brazil's states are adamantly refusing to take the waste for fear of becoming the nation's permanent dump, a situation reminiscent of the current battles over site selection in the U.S.

Thirty tons of irradiated soil, furniture, clothing and other household items are being loaded into hundreds of concrete-lined metal drums and temporarily stored 15 miles outside of Goiania. Several houses and other buildings will either be entombed in concrete or cordoned off for 50 years.

And what of the bodies of the victims? Neighbors of the cemetery in central Goiania, fearful of radioactivity, attempted to block the burial of Leide and her aunt. In a gruesome incident, they hurled cemetery crosses and rocks at the hearse carrying the caskets, forcing the driver to flee for his life. The funeral was later resumed under police protection. The

Close Call with Cesium-137 in New Zealand

Residents of Otahuhu, New Zealand and two dozen steel workers were evacuated around midnight on October 10th after electricians at the Pacific Steel Plant noticed that molten steel had spilled onto a canister containing radioactive cesium-137.

Emergency services were placed on full alert for 90 minutes during the crisis. Fire-fighters wearing breathing apparatus and protective clothing were joined by health officials with a geiger counter at the scene.

Ambulance attendants stood by as radiation specialists entered the factory. Finally, at 1:15 a.m., it was determined that the cesium container had not been breached and the site was declared safe.

Seemingly unaware of cesium-137's deadly effects in Goiania, Brazil, John Pitt-Stanley, the steel plant's general manager, commented: "There would be an absolutely minimal risk of radiation poisoning from any [cesium] leak."

J.S.



Photo by Agence France-Presse

Brazilian President Jose Sarney, accompanied by nuclear technicians, visits cesium-137 victims in the hospital.

volved with radioactivity much longer than Brazil. Three Mile Island and Chernobyl both occurred in countries with allegedly superior regulatory apparatuses, technical know-how and financial resources.

Two wild cards—the "human factor," and the necessity of sequestering nuclear waste—continue to undermine the nuclear enterprise wherever it exists. And as nuclear technology has been applied more and more broadly, its potential for harm has multiplied. As Dr. Marvin Resnikoff, Research Director for the Radioactive Waste Campaign points out, this is another in what has already been a string of incidents in which radioactive materials have inadvertently, and in some cases deliberately, found their way into unsuspecting hands.

One particularly serious incident occurred in Juarez, Mexico in 1984. Cobalt-60 from decommissioned reactor internal components was melted down and recast into metal table legs and structural steel. The radioactive pedestals were assembled into tables in Olivette, Missouri, near St. Louis.

Twenty houses, four thousand tons of steel and several hundred people were contaminated as a result

of the incident. About 0.4 curies of cobalt-60 were involved in the accident. Two hundred people received doses of gamma radiation ranging up to 50 rems and four workers received from 300-450 rem whole body doses, close to the lethal adult level. Two received hand and foot exposures of approximately 10,000 rems.

Other incidents have taken place in New York and Nevada, where employees removed radioactive tools from waste dumps and sold them at auctions.

According to Dr. Resnikoff, such incidents are not even accounted for in determining dose estimates in the U.S. "It is ludicrous that in assessing the levels of radiation future generations may be exposed to, the U.S. Nuclear Regulatory Commission does not take into account such scenarios as the Juarez incident, or incidents involving radioactive tools. With both the stainless steel from Juarez, and the tools sold in New York and Nevada, the value of the metal drove individuals to try to squeeze a profit from it in spite of its deadly radioactivity. Such incidents will surely occur again. And of course, horrible as the incident in Goiania was, one should realize that vastly larger amounts of radioactive waste exist in the U.S. than in Brazil."

The ironies of the Goiania tragedy are many.

First and most obvious is that equipment intended to cure disease and prolong life had such a horrendously different effect due to inadequate control.

Second, in an effort to decouple the accident from nuclear power in the public mind, officials have insisted on calling it a "radiation" accident and not a "nuclear" accident. Normally, of course, nuclear officials go to great lengths to link the two—arguing that the safe handling of medical radiation shows that we can safely handle all nuclear technology (i.e., nuclear plants).

Third, despite Brazil's access to enormous quantities of cheap hydroelectric power, the military government in the early 1970's launched a massive and outrageously expensive nuclear power and development program, one geared not only to the production of electricity, but also to the creation of nuclear weapons. In 1979 and 1980, however, widespread

popular opposition, the criticism of prominent scientists and some government officials, and a downturn in Brazil's economic fortunes combined to halt development of a substantial portion of the proposed nuclear power program.

Seemingly oblivious to growing popular anti-nuclear sentiment, Brazilian President J. Sarney announced just days before the Goiania accident that Brazilian scientists had mastered the uranium enrichment process. In so doing he confirmed the CNEN statement of last December that Brazil had in place all of the infrastructure and information needed to produce nuclear weapons.

END Journal reported that a Brazilian magazine had evidence that by 1986, Brazil had spent a billion dollars on nuclear weapons research. As always, one is compelled to ask for whose benefit and for what purpose this research is being done. Certainly not for people in Goiania who are so poor they must scavenge. The \$30 which Roberto Santos Alves received for his deadly container is the equivalent of a month's wages in Brazil. Many of the accident victims would have been unable to afford treatment at the radiological clinic that housed the fateful machine. Now, of course, they are receiving millions of dollars in medical services.

The tragedy in Goiania has further increased concerns among the 100,000 inhabitants of Angra dos Reis, a town near Brazil's only functioning nuclear power plant. Known as Angra I, the plant has had countless operational problems, and has been forced to suspend operations so many times it has been nicknamed "the Firefly." There is no adequate evacuation plan for the area, nor roads or vehicles enough to transport a large population in the event of an emergency.

Will the concerns of Angra I's neighbors be heeded by Brazil's government in the wake of Goiania? Will Brazil turn its back on membership in the still-prestigious nuclear weapons "club?" As the evidence of human incapacity to manage the atom continues to mount, one can only hope that people in Brazil and in other countries will be successful in convincing governments to turn a deaf ear to the siren call of nuclear power and weapons.

Nuclear Casks Recalled Due to Safety Questions

By Lindsay Audin

Eleven types of spent fuel and plutonium shipping casks have been suspended after serious questions were raised about their safety. Meanwhile, a container designed to move transuranic wastes has been canceled prior to production because it could not comply with federal safety regulations.

The spent fuel and plutonium casks were licensed by the U.S. Department of Energy, which has jurisdiction over containers serving federal nuclear laboratories and nuclear weapons facilities. The recalls cover virtually all spent fuel casks certified solely by the Energy Department. Most were designed and manufactured in the early or mid-1970's and have been used in hundreds of shipments throughout the country.

The safety problems came to light

***Recalls cover almost
all spent fuel casks
certified solely by
the DOE.***

when the Department of Energy requested Nuclear Regulatory Commission approval of the containers so they could be used by Commission licensees (primarily private and university research reactors). The Commission refused, citing numerous deficiencies in the casks' design, testing and/or documentation.

The Department of Energy was unable to fully answer the Commission's questions and, in mid-1983, the two agencies agreed to drop the matter. The Energy Department withdrew its request for approval

Lindsay Audin is a mechanical engineer who has been involved in transportation issues for 13 years. He was instrumental in exposing numerous nuclear cask problems in the past.

and the Nuclear Regulatory Commission said no more about its concerns.

A year later, however, Citizens Against Nuclear Trucking (CANT) came across a memo discussing the casks when it was investigating the MH-1A cask slated to move shipments through the New York City,

CANT exposed the problems with the MH-1A at a public hearing in late 1984. The cask was then modified and the Department of Energy began using it in January 1985, despite outstanding questions raised by the Nuclear Regulatory Commission.

Five months later, continued pressure by New York City and congressional representatives resulted in the suspension of the MH-1A by the U.S. Department of Transportation, which has final authority over all hazardous materials containers. The Transportation Department did not, however, take any action on the other ten casks, believing instead that the Energy Department had voluntarily stopped using them after the MH-1A was suspended.

The cask problems were brought before a congressional committee by CANT members in August 1985, despite strenuous attempts by the Department of Energy to block their testimony.

Over the next 16 months, Energy Department officials began slowly terminating the licenses of some of the casks until January 1987, when three casks were terminated, followed by another in April and the last mid-1987.

Incredibly, up to that point the Department of Energy had continued using at least two of the casks, despite potential safety problems and despite what it had told the Department of Transportation. One potentially defective container was used 79 more times. The plutonium container in question continued in use for 18 months (between 1982 and 1984) after the Energy Department told its laboratories to discontinue its use. During that period, at least 9 ship-

ments involving 170 containers were made.

A similar disregard for safety was evidenced by the Department of Energy's recent attempts to skirt regulations requiring no release of radioactive materials from transuranic waste containers in transit.

The Department of Energy handles transuranic-contaminated wastes which contain plutonium and simi-

continued on page 8

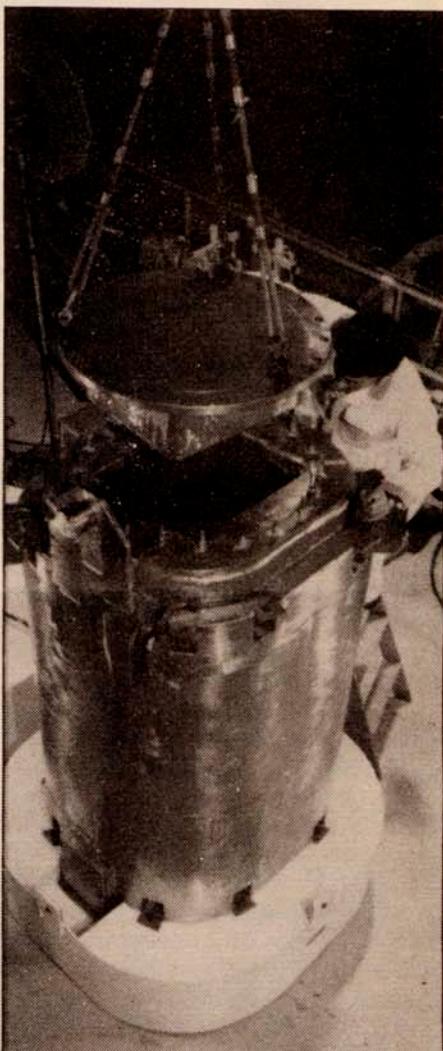


Photo by U.S. DOE

One of the DOE spent fuel casks recently withdrawn from service due to unresolved safety questions.

Radioactive Iodine Found Below Hanford Reservation

By Marvin Resnikoff

Wells drilled down to a supposedly confined aquifer deep below the federal government's Hanford Reservation have shown elevated levels of the long-lived radionuclide iodine-129. The discovery raises serious questions about the U.S. Department of Energy's safety practices, and about the Hanford area's suitability as a potential high-level waste repository.

The 570-square mile Hanford Reservation is operated by the Energy Department to produce plutonium for nuclear warheads. Located in the lower central part of Washington State, Hanford includes a variety of facilities: the Purex reprocessing plant, the N-reactor, plutonium and uranium conversion plants and landfills, and cribs and tank farms for nuclear waste.

The Hanford Reservation is bordered by the Yakima and Columbia Rivers, and it sits atop an area rich in groundwater. The site is underlain by basalt, a lava-like formation, and between the basalt levels are confined and unconfined water-bearing formations—aquifers.

Iodine-129 was detected in a 1350-foot deep well drilled down to the Mabton confined aquifer. The well, DB-07, is located 13 miles southeast of the Purex reprocessing plant, 200 West Area, near the Yakima River.

The DB-07 data indicate that, although I-129 levels decline by 5 orders of magnitude (100,000) within a few hundred feet of the surface, they then rise 4 orders of magnitude in the Mabton confined layer.

Iodine-129 has a 16 million year half-life. Although it was detected only in trace quantities which do not exceed Environmental Protection Agency drinking water standards, the radiation levels are still 1000 times greater than background. In addition, they are literally miles from

a likely source.

Where, then, did the radioactive iodine come from? The Energy Department has offered numerous explanations for the contamination: uranium deposits, fallout and surface contamination. But are these explanations plausible?

First, since no elevated levels of uranium are present, well DB-07 cannot be exhibiting natural contamination. Second, the fallout contribution of iodine-129 is laughingly small compared to amounts from reprocessing operations. Third, reactors would unlikely release much iodine-129. And fourth, contamination from the surface must be ruled out for two reasons: the wells were cleansed by extensive pumping, and contaminants like tritium which have moved

The discovery raises serious questions about Hanford's suitability as a high-level waste repository.

over the surface were not detected below ground in the confined Mabton level. Tritium has moved 6 miles from the area of the Purex reprocessing plant, and is found at levels of 200,000 to 2,000,000 picocuries per liter near the Columbia River. But there is little tritium *below* ground in the Mabton aquifer, indicating that the iodine contamination detected there did not move across the surface.

Clearly, the most likely source of the radioactive iodine is contamination from Hanford reprocessing operations. At the Purex reprocessing plant, plutonium is chemically extracted from irradiated nuclear fuel from the N-reactor. (Because the N-reactor has design similarities to some Soviet reactors, and has no containment structure, the reactor has

not operated since the Chernobyl accident.)

In the Purex process, after irradiated fuel is dissolved in nitric acid, an organic solvent, kerosene with TBP (tributyl-n-phosphate), is vigorously mixed into the acidic solution. As the kerosene settles out, uranium and plutonium remain in the organic solvents, while the fission products remain in the aqueous solution which is the high-level waste. Plutonium and uranium are later stripped from the organic solvent. After several cycles, the organic solvent breaks down and requires disposal. This organic solvent contains trace amounts of plutonium and iodine-129, but not much tritium.

How much iodine-129 is contained in the organic solvent depends on process variables. Lately the intention has been to volatilize iodine-129 at the dissolution stage, and capture the gaseous iodine early on in an iodine trap. But, prior to 1972, much iodine-129, probably at least half, remained with the organic solvent.

It is this solvent from reprocessing operations which is the most likely source of the iodine-129 contamination. But how could the I-129 enter a supposedly confined aquifer? Vertical fracture networks probably allowed iodine-laced kerosene to move rapidly down to the Mabton level. In other words, the Mabton aquifer is apparently connected to the surface near the 200 West area.

But, there still remains another question: how could Iodine-129 move over 13 miles to well DB-07 in 30 years?

The experience at West Valley, New York provides a valuable clue. At West Valley, the identical reprocessing solvent was stored in 1000-gallon tanks in a burial ground licensed by the Nuclear Regulatory Commission. Computer models incorrectly predicted the movement of iodine-129 from leaking tanks at West Valley. The reason: kerosene has different properties from water. Quite

simply, kerosene is lighter than water; thus it remains at the top of the aquifer. Detection of iodine-129 was particularly tricky at West Valley because kerosene was not necessarily at the screened depth, but rose or fell with the water table.

The Radioactive Waste Campaign theorizes that the iodine-laced kerosene at Hanford did not uniformly mix when first entering the Mabton aquifer. Rather, it remained in a thin layer at the top. This could explain why the iodine-129 levels detected in Mabton varied so dramatically from one day to the next in the same hole. The process of testing, pumping water from a well, etc. produced a cone of influence. Iodine-laced kerosene could go undetected unless there was a rapid drawdown. Measurements show that natural iodine-127 levels remained steady while iodine-129 jumped by a factor of 100 in the same day of testing.

The iodine-laden kerosene apparently moved quite rapidly across the top of the aquifer. The I-129 levels in DB-07 are a clear indication of this. Since contamination also appears in

well DDH-03, it appears that the Mabton aquifer is connected to upper aquifers near the Columbia River. Pressure appears to be upward from the Mabton aquifer to Frenchmans Spring aquifer near the Columbia River.

Thus, it appears that iodine-129 contaminated solvent and tritium are handled in separate waste streams at Hanford. Tritium apparently moves along the surface towards the Columbia River, six miles from the 200 East Area. Iodine-129, probably disposed of in cribs, appears to have moved directly down to the Mabton aquifer. These two contaminant streams then appear to be moving separately to the Columbia River, tritium on the surface and iodine-129 deep below ground.

Unfortunately, testing for Hanford contamination by the federal government has been at best inadequate. Remarkable as it may seem, the Department of Energy *has never tested the Mabton aquifer for kerosene*. It is typical of the Atomic Energy Commission and now the Energy Department that radioactive materials were poured into the ground through cribs, and put in shoddy drums, while serious testing of the aquifer below was not carried out until 20 years later.

Beginning with an unreleased paper by Brauer in 1975, the Department of Energy has known about underground contamination at Hanford. An extensive drilling and monitoring program to a deep unconfined aquifer was actually begun in 1973, and samples were taken through 1980. However, the program was halted when the Energy Department began seriously investigating Hanford as a potential site for a high-level waste repository. Only under the glare of public light did the Department again begin monitoring the underground aquifers in 1985.

Clearly, knowledge of connectivity of the basalt levels at Hanford is extremely damaging to attempts by the Department of Energy to locate a high-level waste repository in the area. Billions of curies—many times the radioactivity from Hanford operations—would be disposed of in such a repository. Contamination of groundwater could be disastrous. This could explain why the testing program was halted, and why the 1975 Brauer paper was not released.

The Department of Energy is not in a

position to objectively investigate this problem, and to determine the suitability of the Hanford site as a high-level waste repository. Hanford must be removed as a potential repository site and the apparent suppressing of vital information by the Department of Energy must be investigated by an independent commission.

Casks/continued

larly dangerous isotopes originating in weapons fabrication. To dispose of them in its Waste Isolation Pilot Plant in New Mexico, the Department designed TRUPACT, a container with vents that gradually leak gases that build up due to radiological bombardment within the wastes.

The U.S. Department of Transportation's rules do not allow such releases, so the Energy Department tried to obtain a special waiver so as to be able to use TRUPACT. Technical questioning by New Mexico environmental officials and citizen activists drew so much attention to this ploy, however, that Transportation officials backed away from granting the request. The Department of Energy then abandoned the \$100 million TRUPACT design and is now starting over again, this time seeking a design that won't leak.

While the Department of Energy has stated that it will only use casks certified by the Nuclear Regulatory Commission, a Commission legal opinion indicates that the Energy Department is not bound to do so by any law. The Department of Energy issued a similar opinion in 1980. At that time it was seeking to continue using the FL-10 plutonium cask after it was suspended by the Nuclear Regulatory Commission because of a near miss involving improper packaging.

The Energy Department's actions expose its dangerous and mistaken view that nuclear transport safety is not a serious issue. Such an agency cannot be allowed to oversee the next generation of cask design, testing and handling, as delegated under the present Nuclear Waste Policy Act (NWPA). It is essential that all cask certification powers be removed from the Department of Energy and vested in the Nuclear Regulatory Commission to avoid repetition of these dangerous events.

Addressing the Michigan Legislature



Photo by Brian Ewart

Dr. Marvin Resnikoff presents the findings of *Living Without Landfills* before a special session of the Michigan State Legislature in November.

British Activists Unite to Oppose New Waste Plans

By Pete Roche

Government and nuclear industry officials in Britain have launched a major new drive to knock anti-dumping forces off balance and push ahead with nuclear waste disposal plans.

The key word in the new strategy is "consultation." In November, a special document was published by NIREX, a joint industry-government body which has responsibility for nuclear waste management.

The document initiated a six-month "consultation" process, during which time the public is invited to make a choice as to the best option for dealing with low- and intermediate-level waste. But there is a catch, and a very big one at that: the

grass roots groups responded swiftly to NIREX's November announcement, denouncing the "consultation" process as a farce. Meanwhile, activist groups in England pledged their support for anti-nuclear groups in Scotland, effectively cementing a nationwide anti-dumping coalition.

The "consultation" strategy is really just the latest effort by government and the nuclear industry to piece together a waste management strategy in the facing of rising popular opposition. That opposition has dealt officials a series of stinging blows over the past eight years.

Investigations began in the late 1970's to find a deep depository for high-level waste. The government's geological research institute identified several sites around Britain where they wanted to carry out test drilling to discover the suitability of the rock. However, before such drilling could take place, planning permission was required.

In February 1980, a public inquiry was held into an application by the Atomic Energy Authority to carry out test drilling on Mullwharchar hill in southwest Scotland. A further inquiry, looking at the Cheviot Hills on the English/Scottish border, took place later that year. These inquiries served to fuel massive public opposition to the waste program.

The government backed down and abandoned the high-level waste program in December 1981. The research program was left in tatters. The only site where test drilling had taken place was at a place called Altnabreac in the far north of Scotland, where a large percentage of the population works at the Dounreay experimental fast breeder establishment.

The government decided that high-level waste should be vitrified (solidified into glass blocks) and then stored for at least 50 years before final disposal. Storage should be at Sellafield, the spent fuel reprocessing facility in Cumbria.

Reprocessing is a key element of Britain's nuclear program. The spent fuel from the older Magnox reactors is already reprocessed at Sellafield, and a Thermal Oxide Reprocessing Plant (THORP) designed to reprocess fuel from the newer Advanced Gas-cooled Reactors (AGR's) and the next generation of reactors—pressurized

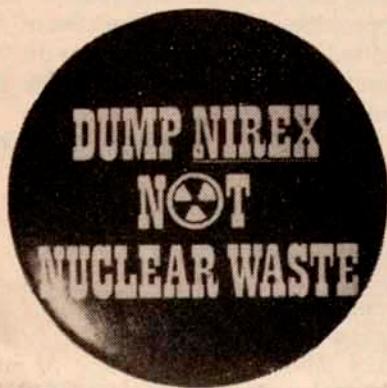
When test drilling was due to begin, hundreds of families formed human barricades to block contractors from entering.

water reactors—is currently under construction there as well.

Sellafield, previously known as Windscale, was the scene of Britain's worst nuclear accident just over 30 years ago in October 1957. The number 1 Windscale pile, designed to produce weapons-grade plutonium, suffered a graphite fire. The resulting plume scattered radioactive dust over much of Northern Europe.

An important consequence of the policy of reprocessing spent fuel is that the volumes of waste are multiplied hundreds of times. For every 4 cubic meters of spent fuel which is reprocessed, 600 cubic meters of low-level waste, 40 cubic meters of intermediate-level waste and 2.5 cubic meters of high-level waste are produced.

High-level waste is the intensely radioactive, thermally hot liquid waste resulting from reprocessing spent fuel. Intermediate-level waste includes a whole range of things from contaminated equipment to spent fuel cladding. In the past some of the contaminated equipment was dumped at sea, but now it is mostly stored at the nuclear reactor sites or



range of choices has been carefully limited in advance.

"This whole so-called 'consultation' is a sham," said one citizen activist. "It's a transparent attempt to weaken the opposition to dumping." Indeed, according to the *Guardian* newspaper, "If NIREX can get acceptance of a method, half the protest lobby will be neutralized before the search for a site begins."

Pete Roche is a founding member of the Scottish Campaign to Resist the Atomic Menace (SCRAM). He is currently features editor of their bimonthly journal.

at Sellafield. Low-level waste includes things like contaminated clothing, building materials and paper. Most of this is dumped in shallow trenches at Drigg near Sellafield.

Meanwhile, as the high-level waste repository program was being stymied, the campaign against the dumping of low- and intermediate-level waste in the sea was gathering momentum. This method of disposal had been going on since 1949, and in the last annual dump in 1982, nearly 3000 tons were disposed of in this way.

The disposal of waste at sea is controlled by an international agreement, the London Dumping Convention. Early in 1983, a two year ban, later to be extended, was agreed upon while scientific investigations were undertaken.

Initially Britain intended to ignore this decision, and the 1983 annual dump was to go ahead. However, action taken by a number of trade un-

ions, including the National Union of Seamen, prevented it, and subsequently the government announced its intention to abide by the decision of the Dumping Convention.

With high-level waste now being stored for 50 years, and sea dumping ruled out, attention shifted to devising a new plan for dealing with low- and intermediate-level waste. In 1983, a new policy was announced: a deep anhydrite mine under Billingham, in the north of England, was proposed as a site for intermediate-level waste; and Elstow, in southern England, was proposed as a site for the shallow burial of low-level waste.

Opposition groups sprang up in both areas, and the Billingham site had to be abandoned in January 1985. One reason given was that ICI, the mine's owners, refused access to the official survey team because of huge pressure from the local community. The unions operating in ICI's chemical works had threatened to shut

down the plant if ICI cooperated with authorities on the nuclear dump plan.

Three further sites joined Elstow on the short list for a low-level waste shallow burial site in February 1986. To avoid another embarrassing public inquiry, Special Development Orders were granted in Parliament to permit survey engineers to gain ac-

Each time a waste dump plan is defeated, more people join the call for a halt to all dumping—anywhere.

cess to the sites.

Opposition groups grew in all four areas. When test drilling was due to start in August 1986, hundreds of families formed human barricades and successfully prevented the contractors from gaining access to three of the sites for three weeks. The same thing happened at the fourth site in September. Contractors eventually gained access only by the use of court injunctions and a heavy police presence.

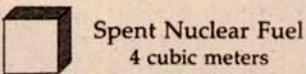
Since 1982, the disposal of low- and intermediate-level radioactive waste had been the responsibility of NIREX, a company jointly owned by the electricity boards, British Nuclear Fuels Ltd. and the UK Atomic Energy Authority. In other words it is composed of the organizations which produce the bulk of the waste.

On May 1, 1987, the government abandoned the four low-level waste sites in response to a letter from John Baker, the head of NIREX. Mr. Baker suggested a "major change of approach." The low-level sites should be abandoned and efforts should concentrate "on the development of options for the deep disposal of intermediate-level wastes with the additional intention to piggy-back low-level wastes in the same facility."

Though the announcement was camouflaged in technical language, it was clear that this was a political decision. Three of the proposed sites were in constituencies held by government ministers, and unpublished

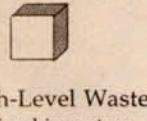
Waste Created by Reprocessing Spent Nuclear Fuel

before reprocessing

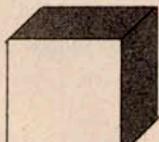


Spent Nuclear Fuel
4 cubic meters

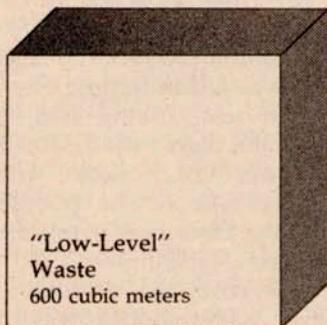
after reprocessing



High-Level Waste
2.5 cubic meters



Intermediate Level Waste
40 cubic meters



"Low-Level"
Waste
600 cubic meters

Rather than being a means to reduce nuclear waste, reprocessing actually results in the generation of more waste. Reprocessing 4 cubic meters of spent nuclear fuel creates almost 650 cubic meters of radioactive waste.

continued on page 14

Activists Meet to Map Waste Strategy

By Minard Hamilton

Several dozen nuclear waste activists met in Ann Arbor, Michigan on November 21 and 22 to plan a national strategy on the waste crisis. The participants, many of whom had driven 15 hours or more to get to the meeting, came from Nebraska, Louisiana, Kansas, Iowa, North Carolina, Illinois, Maine, New Hampshire, New York, Pennsylvania and Washington, D.C.

The two-day session was pulled together by Nuclear Information and Resource Service staff member Diane D'Arrigo, who is also on the Radioactive Waste Campaign's board of directors. The meeting provided a heady and exciting time to compare regional and state nuclear waste news, share information and develop strategies.

Although most of the participants were focused on the "low-level" nuclear waste problem, some veteran high-level waste activists were also present.

The groups hammered out the outlines of a national policy on nuclear waste. The national platform included the following points:

- "Low-level" nuclear waste must be redefined. It must be limited to materials that are hazardous for no longer than the institutional control period which is presently defined as 100 years. (The 100 year clock starts ticking after the closure of the burial ground, which is generally assumed will remain open for 100 years. Thus, anything with a hazardous life of more than 200 years would be eliminated from the "low-level" category.)
- The method of isolation must be above-ground, monitored, and retrievable.
- Reactors should be phased-out in an orderly fashion with adequate attention given to retraining of any workers dislocated in the process.
- The suit by the attorney general of Vermont questioning the federal government's right to force states to take

title to "low-level" nuclear waste is supported.

- Congress must define the rights of states to go-it-alone and whether going-it-alone permits the exclusion of out-of-state wastes.

A major debate at the meeting centered on the issue of at-reactor storage. Is it ethical to foist more waste on people living near reactor sites, even though the amount of radioactivity already at the sites is enormous? Isn't there an advantage to not having a further proliferation of new dump sites—by keeping the material at sites that are already dumps—the reactors? Isn't this the most equitable approach, since 99 percent of the radioactivity is generated by utilities? But what should be done about reactor sites which are unsuitable because of their location on floodplains, near important bodies of water, or on top of earthquake faults? The group was unable to resolve these sticky questions and tabled the issue.

During the strategy session, partic-

ipants agreed to send a letter to all the presidential candidates with a copy of the platform. The letter will also be circulated to state officials and local county commissioners.

There was considerable debate on the merits of trying to re-open the Low Level Radioactive Waste Policy Act. Ultimately, the group decided that citizens in different states and regions should make individual decisions on this matter.

A "Christmas" list for congressional representatives was also developed. This is a list of issues for constituents to bring up with representatives and senators during the holiday break. Some of the issues: waste redefinition, milestone slippage, liability questions, exclusion rights, federal pre-emption, insurance, above-ground, monitored and retrievable storage, and below regulatory concern.

There was also some general discussion regarding the need for unity

continued on page 15



Photo by Brian Ewart

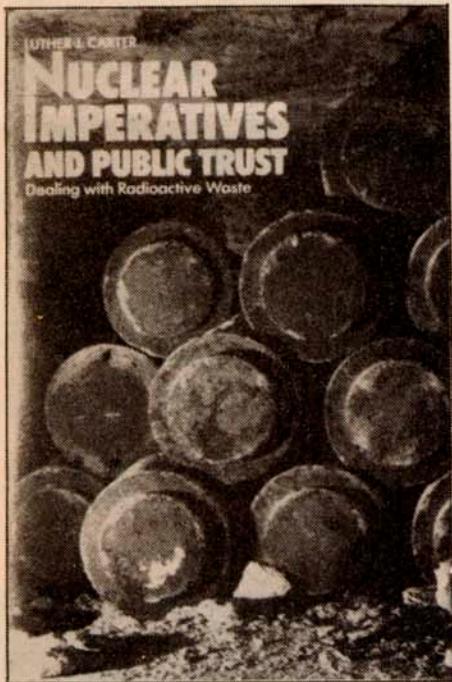
Diane D'Arrigo, Judy Johnsrud, Minard Hamilton, John Leuthold and Cia Iselin in a strategy session at the first national "Low-Level" Waste Conference, held in Ann Arbor, Michigan, November 1987.

REVIEWS

High-Level Waste: Searching for a Solution

By Don Hancock

A Review of Nuclear Imperatives and Public Trust, Luther J. Carter, Resources for the Future, 1987.



This is one book about nuclear waste that is receiving attention from Congress, the media, the nuclear industry and citizens concerned about nuclear waste.

The controversy generated by the book is not about factual inaccuracies (though there are a few), nor about a conclusion that "the U.S. [nuclear waste] program is caught in a procedural, legal, and political morass from which some way of escape must be found."

Rather, the controversy surrounds the author's conclusion that "the way out" is to abandon the current legal requirements for nuclear waste siting and instead "to focus the search on a

Don Hancock is Director of the Nuclear Waste Safety Project at the Southwest Research and Information Center in Albuquerque, New Mexico.

few areas, and, indeed, to place emphasis on a single primary candidate site." And which site? "The Yucca Mountain site in Nevada seems by far the most promising."

The controversy obscures positive aspects of *Nuclear Imperatives and Public Trust*, which will be noted before discussing the major flaws in the proposed "solution."

Luther Carter uses his journalist's background to combine research and personal interviews in a useful overview of the history and current status of nuclear power and waste management in the U.S., Britain, France, Germany, Sweden and Japan (curiously, Canada is not mentioned).

Throughout the book he also effectively makes two important points: First, nuclear power and nuclear weapons technology "got ahead of itself" by not recognizing and adequately dealing with "two indisputable imperatives[:] . . . to safeguard potential nuclear explosives, particularly the plutonium created as an inevitable by-product of the fission process" and "to contain radioactivity in reactor and nuclear fuel cycle operations."

Second, Carter understands that reprocessing is no solution to the high-level waste problem, and that it threatens public health and safety for several reasons: it leads to nuclear weapons proliferation, its facilities create major environmental risks, and it is not economically viable because plentiful supplies of uranium are available to fuel power plants.

Carter is appropriately concerned about the growing accumulation of spent fuel in Europe and Japan and the resulting commitment in some countries to use reprocessed fuel not only in nuclear weapons but in a new generation of power plants.

Carter's alarm at prospects for expanded reprocessing leads him to conclude that "global or multinational solutions to the problem of

spent fuel storage and disposal are needed, and needed now, as an alternative to reprocessing. . . . Of all nations, the United States has the best chance to perfect and demonstrate by the end of this century a technically and politically robust system for meeting these imperatives—and meeting them in a way persuasive to other countries, even those that see reprocessing and breeders as ultimately critical to their energy security." The U.S. must act quickly—"a way out of the present impasse must be found with some urgency."

The author ignores the fact that a major reason for that impasse is the sense of urgency of the Department of Energy and the nuclear industry to put wastes underground some place no later than 1998. Moreover, the impasse is not caused just by "procedural, legal, and political" problems, but also by profound technical uncertainties about geologic disposal and the sites proposed so far.

Fundamental flaws in the Carter approach include: endorsing the to-

Picking the least bad of 3 technically unsuitable sites will not solve the high-level waste problem.

tally discredited waste program, continuing the Department of Energy as the agency in charge, providing financial incentives to only one state, and ignoring transportation risks.

Carter agrees that politics, not technical suitability, was a major consideration in the Energy Department's choice of preferred high-level waste repository sites. He says "to undertake a new national search for sites now, as officials of some First Round states have suggested, would

try everyone's patience and be a thoroughly impractical endeavor" because of the urgent need for a quick solution.

But picking the least bad of three technically unsuitable sites will not solve the waste problem. Either the inadequacies of the site will force the licensing agency (the Nuclear Regulatory Commission) or the courts to prohibit its use or the flaws will be tolerated and the repository built. Then, present or future generations will suffer the health effects of a leaking repository, effects likely to be far worse than those from releases at some existing waste storage sites.

Many of those leaky facilities are operated by the Department of Energy, the agency which has lost all credibility in its handling of the waste program. A "new" program will not restore the Department's credibility. Rather, the program will be doomed to failure because of the Department of Energy's record of incompetence.

In any event, to coerce or bribe any state (Nevada) to accept the repository may or may not immediately succeed. Carter writes: "An effort should be made to reach an understanding with Nevada's governor, its senators and representatives, and possibly some of its key state legislators. It would consist of a quid pro quo, with Nevada to acquiesce in the siting activities at Yucca Mountain and in return receive substantial benefits, perhaps cash bonuses and generous payments in lieu of taxes, plus assurances that the state would be allowed a strong voice in certain matters of public concern, such as the way spent fuel would be shipped into Nevada."

What Carter does not foresee is that other states (such as western states that do not rely on nuclear power and therefore have no incentive to put themselves at risk) may also demand financial compensation and may object to Nevada's preferences regarding transportation routes and shipping schedules. Controversy and delay will again result.

Carter says that "the transport of spent fuel that has been properly aged and is properly escorted can be quite safe—contrary to the impression conveyed by the disaster scenarios long put forward, and often believed in, by some anti-nuclear activists."

On the contrary, large-scale trans-

Photographing the Bomb

By Ed Hedemann

A Review of *At Work in the Fields of the Bomb*, Robert Del Tredici, Harper and Row, 1987.

AT WORK IN THE FIELDS OF THE BOMB

PHOTOGRAPHS & TEXT BY

Robert Del Tredici

INTRODUCTION BY JONATHAN SCHELL

"How radioactive are the warheads?" asked the reporter.

"Very low, because people handle 'em all the time. I used to sleep on top of one," answered the public relations manager at the final assembly plant for nuclear weapons at Pantex near Amarillo, Texas.

portation of spent fuel has never been done and presents major technical problems: transport containers that can reasonably guarantee public safety have not yet been designed, and trucks and trains will have accidents, as they always have.

Importantly, the public believes that transportation is dangerous. Thus some local governments and perhaps some states along the transport routes (which pass through more than 40 states) will try to regulate or prohibit waste shipments—again leading to controversy and delay.

While Carter knows something about the nuclear imperatives, he is wrong to think that public trust will result from his approach (or the blatantly political approach embodied in the Johnston bill recently passed by the U.S. Senate). The French govern-

"You did? Does your wife know about this?"

"Sure."

"What were you doing, sleeping on top of one?"

"I was tired."

From 1981 to 1987 Robert Del Tredici traveled across the United States and abroad, photographing all aspects of the manufacture and use of nuclear weapons, as well as protests against them. He interviewed scientists, workers, managers, military officers, veterans, protesters, government officials, victims and their families.

This is all compiled in a 192-page book, *At Work in the Fields of the Bomb*, published last summer.

The first part of the book is made up of 106 full and half-page plates—striking black and white photographs of people, nuclear bomb facilities, and bomb components.

The second part is field notes on the photographs, sandwiched between interviews with 34 people and about 50 additional smaller photos. In the interview quoted above, the public relations official went on to explain that his bunk on a ship was located above the nuclear weapons it carried.

There is also a description by How-

ment may be able to continue to push through "the siting of nuclear projects even when faced with spectacularly large demonstrations and unanimous opposition by local officials," but such undemocratic tactics will not succeed in the U.S. Rather, citizens and scientists will oppose a rushed "solution" and will stop the program.

Unfortunately, there is no easy solution available now. Too many technical problems and too much public distrust exists for any waste repository to be operational in the next twenty years. Thus, the nuclear imperative of developing public trust essential to siting a high-level waste repository is decades away—the time it will take to implement a scientifically sound waste program worthy of the public trust.

ard Moreland of how a bomb works, accompanied by 7 diagrams.

In the Preface, Del Tredici states that his purpose for the book is to "give the collective imagination something accurate and graphic to hang onto as it strives to come to terms with the Bomb's reality."

Jonathan Schell writes in his Introduction that Del Tredici "has pitted his camera against all the forms of the bomb's invisibility. He had the idea, as original as it was simple, of traveling through the United States to photograph the H-bomb factories."

Most photos relating to nuclear weapons tend to be either insipid exterior views of bomb factories, mushroom clouds, or graphically gory views of Japanese victims. But Del Tredici's photographs are vivid, direct and at times confrontational. Though it's the photographs that draw your attention to the book, the interviews provide a fascinating account of the human stories behind the bomb.

The book is published by Harper and Row, and is available for \$15.95.

RWC Board Issues Statement on Proposed Nuclear Dump in Poland

The Board of Directors of the Radioactive Waste Campaign has adopted a resolution supporting citizens groups working to halt a proposed nuclear waste dump in western Poland. The statement was sent to representatives of "Freedom and Peace," a non-violent, grass roots peace, human rights and environmental movement which has led marches against the dump on the first Sunday of each month since May. Thousands of people have joined in the protests, despite the fact that one march was broken up by police with tear gas, and even though some demonstrators have been fined for participating.

To "Freedom and Peace" (Poznan, Warsaw, etc.) and other independent Polish citizens groups concerned about the environment:

We have recently learned of Polish government plans both to construct a 4000-megawatt nuclear power complex in Klempicz, 30 miles from the city of Poznan, and to bury radioactive waste in former Second World War bunkers in the Miedzyrzec area, which lies on a major aquifer. We have also learned of the growing grass roots opposition to these plans.

Nuclear reactor wastes remain hazardous for tens of thousands of years, threatening not just people today, but all future generations. And as Chernobyl demonstrated, radiation respects no boundaries. We all live at Three Mile Island, at Windscale, at Chernobyl.

We affirm our strong support for the right of citizens everywhere to organize to protect the environment. We stand in solidarity with you in your efforts to halt these dangerous projects.

British Activists/continued

polls showed Conservative supportwaning. With a general election just a short time away, the sites were canceled. Parliament member David Clark, the Labor Party's environment spokesperson, described the decision as "a squalid attempt" by the Conservatives to "save themselves from electoral embarrassment."

So the nuclear waste disposal program was, and is, yet again, in tatters. NIREX, which was basically back to square one, then decided to publish its public "consultation" document on November 12. Officials hope the process will lead to the identification of specific deep repository sites for low- and intermediate-level waste.

NIREX is asking the public to choose from among three options: deep disposal on land; disposal under the sea-bed accessed from land; and sea-bed emplacement using oil-rig technology. In other words, the NIREX "consultation" document merely gives a selection of dumping options.

Fortunately, the anti-nuclear groups have never been stronger.

Each time a proposed site is abandoned, more people are added to the ranks of activists who remain determined to stop nuclear waste dumping from happening not just in this place or that, but anywhere.

On the day that NIREX launched its new strategy, a nationwide coalition of anti-nuclear groups launched their alternative proposals at press conferences held simultaneously in London and Edinburgh.

The groups have united to call for a halt to all current and proposed disposal of nuclear waste, and have proposed instead storage on site where the waste is produced. The groups denounced the fact that high level radioactive waste has been excluded from the "consultation" process, and referred to "the farce of a 'consultation' process which does not offer the public the option of ceasing production of the most lethal waste ever produced by man."

The abandonment of the English low-level dump sites before the election has increased concern that Scotland might be chosen for the deep disposal of nuclear waste. Alan Tubb of Highland Anti-Nuclear Group

pointed out that the Highlands of Scotland have a land mass of 25,000 square kilometers, but a population of only 200,000. The whole of Scotland has only 10 Conservative members of Parliament out of a total of 72 seats. This is not many votes to be lost if NIREX chooses a site in Scotland.

At the Edinburgh press conference organized by Scotland Against Nuclear Dumping (SAND), Pat Hewiss, a veteran of the campaign against the low-level dump sites in England, pledged the support of the English groups, should NIREX try to come to Scotland.

Now that there is a nationwide coalition of groups opposed to dumping anywhere, unless the government intends to use even more authoritarian powers than we have seen hitherto, it's difficult to see how NIREX can hope to succeed with its plans.

Moving?

Tell us your new address. Don't miss a single issue (third class mail is not forwarded).

Fallout?

"Fallout," radiation contamination landing on earth from nuclear bomb tests and accidents, has a new meaning at the Nuclear Regulatory Commission. Fallout means radioactive containers *falling out* of trucks onto highways. It's happening so often the NRC felt compelled to send out a notice on how to tie down packages to licensees. In the NRC's own words, some examples:

"On April 25, 1986, an exclusive-use shipment of low-level waste from a nuclear power plant in the midwest arrived at the Barnwell, South Carolina waste disposal site. The inspector for the State of South Carolina who was at the site observed that the three packages on the flatbed trailer had shifted in transit as a result of inadequate blocking and bracing.

"On July 7, 1986, a nuclear fuel plant in the southeast made a shipment of two 10-ton uranium hexafluoride cylinders to the gaseous diffusion plant at Paducah, Kentucky. After departure, one cylinder broke free and fell from the vehicle onto the ground when the truck made a sudden stop. Contributing causes of the load separation were a faulty hold down strap and inadequate bracing and tie-down of the cylinder and cylindrical supports.

"On June 5, 1986, an exclusive-use shipment of low level waste from a nuclear plant in the South arrived at

the Barnwell disposal site. When the State of South Carolina inspector at the site opened the closed trailer, he observed that the blocking and bracing that had been providing was inadequate to prevent the movement of some drums during transit."

Without providing details, the NRC also reported other incidents, "where [radiography] devices are dropped and lost from moving vehicles, often without the driver's awareness." Radiography devices are potent gamma ray emitters, having contact readings of 150 rads per hour, the equivalent of four chest x-rays per second.

In the "I told you so" department, the book *The Next Nuclear Gamble* deplored the regulations on tie-down devices as too weak. In a serious accident, heavy containers will always break free.

If you see a radioactive materials package on the highway, call State authorities. Do not pick it up. Radiation levels may be very high and must first be checked with a geiger counter.

South Africa/continued

shanty in front of the Ports Administration Building to symbolize the plight of black South African miners.

Future shipments of the processed Southern African uranium may enter East Coast ports to avoid Seattle protests.

In related news, the United Nations Council for Namibia has moved to stop the enrichment of illegally-mined Namibian uranium in the Netherlands. The court action accuses URENCO Netherlands (an enrichment company), Ultra Centrifuge Netherlands (URENCO Netherlands' management company), and the Dutch government (which owns 98 percent of UCN) of violating U.N. Decree Number 1 which protects Namibia's natural resources from exploitation under the illegal occupation by South Africa. The U.N. Council seeks to prohibit any enrichment of uranium of Namibian origin in the Netherlands.

If a precedent can be established in Dutch court, the U.N. Council may file similar suits in other countries. Possible legal proceedings against Belgium, France, the U.S., Japan, West Germany and Britain, in their respective courts, have been studied.

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Please check this box if you would like to become a member, as indicated above, but do not want to receive *the Waste Paper*.

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I do not want to join the Campaign at this time, \$8 for 1 year
 but would like to subscribe to *the Waste Paper*. \$14 for 2 years
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Midwest Official Explains Need for Compact Changes

In an effort to meet milestones set by the Low-Level Radioactive Waste Policy Act, many states formed regional compacts and some adopted compact legislation. We asked Gregg Larson, Executive Director of the Midwest Low Level Radioactive Waste Commission, to explain why some compacts are now considering amending their legislation.

Given the time and complexities involved in state legislative ratification, one might ask why some compacts are now considering amendments?

First, compact commissions have had several years of experience with their compact agreements and some have identified shortcomings that need to be addressed or improvements that need to be made.

Second, compacts which were negotiated prior to the selection of a host state did not have the opportunity to consider the specific concerns and needs of that state.

In the past year, Michigan was selected as the Midwest compact's host state. Because the original compact did not adequately address some aspects of disposal facility development and operation, the commission initiated discussions to address items where the compact was silent or lacked specific detail. As the discussions progressed, it became apparent that some needs could be resolved only through compact amendments that legally bound the member states.

Four amendment items, in particular, have been discussed:

1) Shared Liability. The compact lacked any language requiring the member states to share liability for the facility. During initial compact negotiations in the Midwest, all of the states agreed that the host state would be responsible for site selection, disposal technology selection, and operation of the facility. While this "hands off" approach gave the host state considerable flexibility, it also suggested that, if the other member states were not involved in these key decisions, they should not be liable for actions of the host state.

The State of Michigan has argued that, irrespective of the involvement of the other member states, liability should be shared. The commission has since endorsed a concept whereby liability would be shared by the states in proportion to the amount of waste each shipped to the disposal facility. (Such liability would be triggered only where claims exceeded insurance and a long-term liability fund established with operating revenues.)

2) Sovereign Immunity. The extent of liability shared by member states could still be limited by their respective sovereign immunity statutes. To ensure that a state's statute does not otherwise limit its liability, the commission has discussed a proposal to use the sovereign immunity statute of the host state as the single stan-

dard for the region.

3) Shared Costs. Funds for remedial action, long-term liability, and long-term care would be raised through operating revenues over a 20-year period. If the facility had to close earlier than expected, there may be insufficient money in the funds to cover future costs. The commission has again endorsed the concept that, to the extent the funds are insufficient, any additional costs would be shared by the states in proportion to the amount of waste each shipped to the disposal facility.

4) Withdrawal Penalties. Both the commission and the host state want to discourage state withdrawal from the compact. Stiffer penalties would provide a greater assurance of financial stability and permit the recovery of money expended to plan for, and accept, the withdrawing state's waste. More specific penalties have been discussed for host state withdrawal, as well as "take or pay" provisions for other member states.

These and other proposed amendments will be discussed further as the Midwest Commission seeks an agreement on language acceptable to all of the member states. Absent that agreement, it is likely that one or more states would fail to ratify the amendments and the original compact would remain in force, an outcome that neither the commission nor the host state desires.

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