

radioactive waste
campaign

sierra club Waste Paper

Winter 1985-86

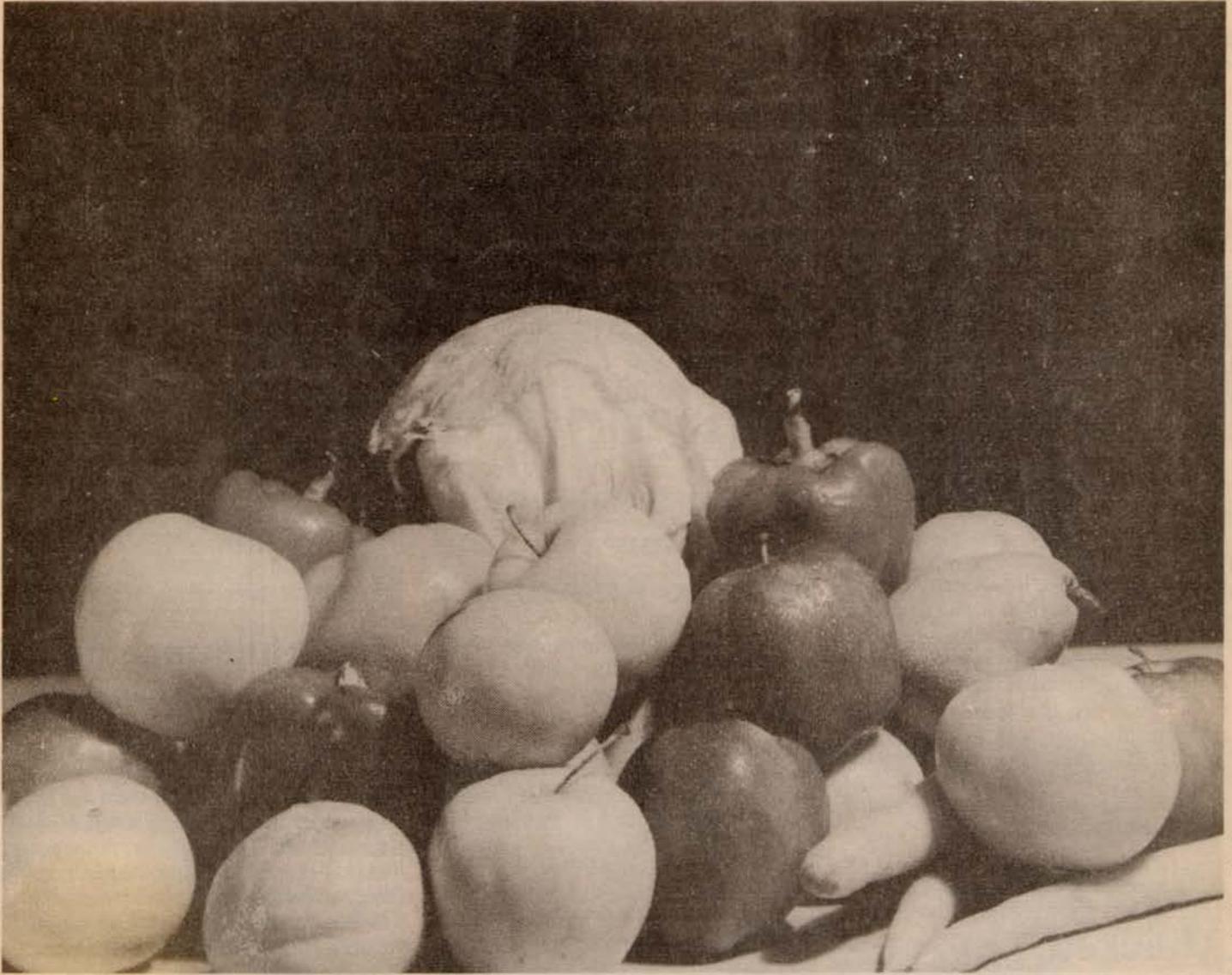


Photo by Gary Reed

Irradiated Food: Uncle Sam's Hot Potatoes

by Kitty Tucker and
Mark Robinowitz

A new form of food preservation is being pushed by the Department of Energy (DOE) with the assistance of the Food and Drug Administration (FDA), which involves zapping our foods with ionizing radiation to kill

parasites and insects (doses up to 100,000 rads) or to kill off bacteria and fungi (doses in the millions of rads). Using irradiation to preserve foods is like using a chain saw to cut butter: it's an extremely expensive and dangerous technology for which viable alternatives exist.

Food irradiation is a process in

which food is exposed to a beam of ionizing radiation from radioactive sources, such as cesium-137 (a byproduct of nuclear weapons production) or cobalt-60, or from machines that generate electron or X-ray beams. Foods are moved past the beam of radiation on a conveyor belt.

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Radscope

Landfills Leak In Malaysia

by Michael Cohn

Malaysian residents won a landmark environmental lawsuit. In the first radioactive waste case heard by a Malaysian court, Asian Rare Earth Sdn Bhd was restrained from producing, storing, and keeping radioactive wastes in the vicinity of Bakil Merah, an inhabited area, and ordered to immediately dispose of the waste it had on hand.

In Asian Rare Earth's (ARE) 2.7 million dollar factory built six years ago, yttrium, an industrial element, is produced from monazite, a substance found in tin tailings. Thorium hydroxide is a long-lived radioactive by-product of the process. This waste is stored in trenches. SAM (Friends of the Earth-Malaysia) discovered these trenches were not built according to international specifications. In fact, plaster had been used instead of concrete for their construction, and several cracks had appeared. Residents said that wastes were being stored in loosely closed drums, and plastic bags, as well as being dumped into a pond adjoining ARE's factory. After testing, Professor Sadao Ichekawa reported dangerous levels of radioactivity at a farm adjacent to the dumping site and in a yard adjoining the Asian Rare Earth factory.

Michael Cohn is an optometrist and a new Waste Campaign volunteer.

Clean Air Act Attacked

Babcock and Wilcox (B & W), the company that has applied for a license to build and operate a large commercial low-level waste incinerator in Parks Township, Pa. (near Pittsburgh), has once again tried to go over the heads of the local citizens who don't want it built there. On New Years Eve, B & W filed suit in federal court against the Parks Township Supervisors challenging the town's authority to pass local clean air ordinances tougher than federal standards.

The township ordinance, urged by the Kiski Valley Coalition to Save Our Children, a local group fighting the incinerator, and based upon research produced by the Campaign last August, restricts releases of tritium to five curies per year, and emissions of carbon-14 to one curie, according to Charles Clark, a Coalition member and Township Supervisor. B & W projected that its incinerator would release 80 curies of tritium and 4 curies of carbon-14 annually.

On February 8, Rob Hager, an attorney with the Christic Institute in Washington, DC, filed a motion to dismiss the case on the grounds that the national Clean Air Act contains provisions empowering local authorities to pass air pollution laws stricter than federal legislation. "If B & W wins this suit," says Jeff Schmidt, Pennsylvania Sierra Club lobbyist, "it would set a dangerous national precedent."

Decommissioning Costs More . . . And So Does Knowing It

Costs to dismantle a power reactor are escalating rapidly, but not nearly as much as the publication costs of reports on decommissioning costs. Estimated in 1980 at \$31 million to dismantle a power reactor, the costs are now thought to be three times as much, according to a recent study by Battelle Pacific Northwest Laboratories, *Updated Costs for Decommissioning Nuclear Power Facilities*, NP-4012, prepared for the Electric Power Research Institute (EPRI). This amounts to a 60% increase per year. Well, the escalation rate for decommissioning costs is one thing, but for EPRI publications is something else. In a 1 1/2 month period, the publication cost for the EPRI study went from \$11.50 to \$25.00. We'd like to review the EPRI decommissioning study for our readers, once we scrape up enough money to buy a copy.

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



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Job Announcement

The Sierra Club Radioactive Waste Campaign is seeking a creative and energetic individual with experience in managing a small organization to fill the position as Director. The Director will be responsible for management, budget-setting, fund-raising, and editing and producing the *Waste Paper* and other Campaign publications. Must be able to work cooperatively with a Steering Committee, volunteers, and staff. We are looking for that rare person who is both an activist and has managerial skills.

For job description, write to Laura Haight, Acting Director, Sierra Club Radioactive Waste Campaign, 625 Broadway, New York, New York 10012. The position is available immediately in New York City. Salary: \$20,000 plus health benefits. Equal opportunity employer.

Outer Space: The Easy Way Out?

Editor's note: This piece was written before the tragic explosion of the space shuttle on January 28, carrying seven astronauts to their fiery death. That accident, not the first in the space program, underlines the folly of attempting to send radioactive waste into space.

by Robin Hewitt

"Why not just get rid of radioactive waste by shooting it into space?"

This question comes up frequently in community meetings when citizens are faced with the danger of a radioactive waste dump in their area. It sounds like the perfect solution, a way to get rid of our worries forever, and with hardly any fuss or bother. So why not? As it turns out, however, this "solution" is neither as perfect nor as easy as it sounds.

Outer space is a big place. Where exactly would the waste go? Among a number of potential waste sites in space, the closest and most easily accessible is a geocentric orbit, that is, an orbit around the earth. Unfortunately, we would not really have gotten rid of the waste by putting it into such an orbit. Rather, the same problem we now have with land and sea disposal—that the stuff doesn't stay where it's put—would threaten us from above as well as from below. Imagine thousands of highly radioactive satellites orbiting the earth. Satellite orbits have been known to decay, and we could not be sure that some of these orbiting waste containers would not fall back toward earth, burning up in the atmosphere, and raining down on us as fallout. Even if the orbits should remain intact, we would still face the problem of leakage, just as we do with terrestrial disposal: meteors, dust, and space debris could damage orbiting containers, releasing radioactive particles, some of which would enter the earth's atmosphere. Further, there would always be a risk of collision between orbiting waste containers, and the chances of such a collision would increase each time another waste container was raised into orbit. One compound of this waste would be plutonium dioxide, a chemical so deadly that inhaling a speck, less than one millionth of a gram, could result in lung cancer.

Since it doesn't seem like such a

good idea to have this stuff circling around right overhead, government-sponsored studies of space-disposal schemes have sought for ways to use other disposal sites in space. A moon crater, the sun, deep space, and an orbit encircling the moon have all been considered as potential disposal sites. Among the sites considered, the one which was deemed to be the most suitable was a heliocentric orbit (an orbit around the sun) between the orbits of Earth and Venus.

The National Aeronautics and Space Administration (NASA) came up with a scheme for sending radioactive waste into this heliocentric orbit. The first step would be to launch something called an Orbital Transfer System (OTS). The OTS would be launched into a geocentric orbit inside a carrier that's basically a space shuttle without the wings. Four hours after this launch, there would be a second launch. This time, it would be a manned space-shuttle type vehicle carrying a payload of radioactive waste. This vehicle would make a rendezvous with the OTS and hand over the waste. Then, while the manned shuttle vehicle stays in a low geocentric orbit, the OTS would swing out in a higher orbit and eject the waste payload along with a small propulsion and guidance system called a Solar Orbit Insertion Stage (SOIS). The remaining portion of the

OTS would slow down to a lower orbit, meet up with the shuttle again and get carried back down to the ground for another round. Meanwhile, the SOIS and the waste package would coast for 165 days in a transfer orbit, after which time, booster rockets in the SOIS would guide the waste package into a heliocentric orbit.

These maneuvers would dispose of about 1200 pounds of radioactive waste. Now, due to the nature of the payload, the shuttle crew is going to be exposed to radiation during the flight. To reduce this exposure, some shielding is required. In addition, the waste must be securely encased to help contain it if something goes wrong and it ends up falling back down to earth. After this casing and shielding are added, our shipment of 1200 pounds of waste ends up weighing more than 60,000 pounds. (1982 Boeing report to NASA)

But if we are to add up all the weight that must be launched into space to dispose of this 1200 pounds of waste, we must also include the shuttle itself as well as the crew members and all the associated equipment. This brings the weight for one shipment up to something on the order of 240,000 pounds. And even this is not everything. For not

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To the Outer Limits or Out of Sight—Out of Mind

Food/Continued

Current laws allow irradiation of dried spices, enzymes, wheat, and potatoes, but the process is commercially used on only a limited amount of spices for processed foods because it is too expensive. Since the food industry has been reluctant to launch this technology on its own, the DOE is trying to sell industry on the idea by providing federal dollars to get programs started.

Several scientific studies have raised questions about the safety of eating irradiated foods:

- Malnourished children fed freshly irradiated wheat developed chromosomal abnormalities of the blood, which have been linked with cancer.

- Fruit flies fed gamma-irradiated chicken had seven times fewer offspring than those fed heat-treated chicken.

- Chemicals called "radiolytic products" appear in foods after irradiation, and some of these chemicals are harmful to human health.

- Vitamins and minerals are destroyed by food irradiation, reducing the nutritional quality of our foods.

- Aflatoxins, which are potent, naturally occurring carcinogenic agents, grow more readily on foods that have been irradiated.

- Some bacteria are very resistant to radiation, and will grow rapidly on irradiated foods, such as the botulism organism.

No environmental impact statement has been prepared for the food irradiation process, despite serious hazards to the environment. The hazards include:

- Increased transport of dangerous radioactive materials on the nation's highways.

- Dangerous exposure to workers at irradiators could result in later cancers, genetic problems, or, in dramatic cases, cause immediate death.

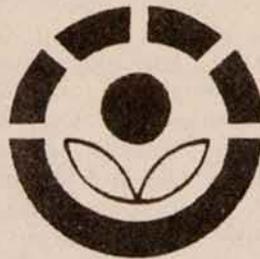
- Contamination of the environment due to accidents at irradiation facilities.

- Potential creation of dangerous mutant bacteria or viruses.

- Increased generation of radioactive wastes, for which storage problems are already severe.

Food irradiation is yet another example of the nuclear industry's forty year quest to find a "peaceful" use for atomic energy to justify the con-

tinuation of the research and development of nuclear weapons. Controlled, peaceful applications of nuclear energy were sought during the "Atoms for Peace" program of the 1950's for nuclear-powered airplanes, cars, home furnaces and even toasters! Most of these ideas were eventually abandoned as unworkable, although powerful members of Congress and the Atomic Energy Commission lobbied for funding of these projects.



The cheerful looking logo, "The Radura," and the statement "Picowaved" are all that will identify food exposed to radiation. Retailers may place the sign over a display bin or box rather than label items individually.

Money for research into food irradiation research kept flowing into the Army's Natick Research Labs. With power reactors now under public suspicion since the partial meltdown of Three Mile Island, food irradiation could be the next peaceful shield for a \$12 billion nuclear budget. In 1986, over \$5 million has been appropriated to build three demonstration facilities to irradiate food with cesium-137 from the Hanford Nuclear Reservation, the world's oldest nuclear weapons production site, located in Washington State. A transportable irradiator has been planned to travel through the Northwest to demonstrate to farmers the idea of irradiation. A stationary facility is under construction in downtown Dublin, California. Bids are being sought for a third irradiator for meat.

On December 12, 1985, outgoing Health and Human Services Secretary Margaret Heckler announced that the Food and Drug Administration had granted final approval for a regulation permitting the irradiation of fresh fruits and vegetables, and for tripling the dose currently being used on spices (in response to a petition from the McCormick spice company). Under the proposal, the cur-

rent label of "treated with gamma radiation" will be replaced by the fabricated term "picowaves", and a symbol that looks like flower petals in a circle, called the "Radura". This regulation is currently under review at the Office of Management and Budget before publication in the Federal Register. Many see Heckler's action as a parting gift to the radiation industry. (The Natick Labs were located within her district where she was a member of Congress, and companies that might get involved in this industry were among her campaign contributors.)

Federal legislation called the "Federal Food Irradiation Development and Control Act" has been introduced by Representative Sid Morrison (H.R. 696) and Senator Slade Gorton (S. 288) to promote irradiated food. Both legislators are Republicans from the State of Washington and their districts include Hanford. With the current administration's plan to build 17,000 new hydrogen bombs by 1994, nuclear waste storage problems are growing dramatically. It is understandable that Morrison and Gorton want to redistribute part of Hanford's nuclear waste across the country.

The promotion of food irradiation by the DOE may also be part of a long term plan to get around the current law (the 1983 Hart-Simpson Amendment to the Atomic Energy Act) which prohibits reprocessing spent nuclear fuel from commercial nuclear power plants to procure plutonium for the nuclear weapons program. DOE plans to build a facility with the capacity to reprocess commercial spent fuel at Hanford where a long-term repository for high-level nuclear waste, including spent fuel, is proposed. If DOE can build a demand for Cesium-137, it could decide to reprocess commercial spent fuel to obtain Cesium-137, and remove the plutonium as part of the separation process. With such a facility already in operation, DOE would have a better chance of convincing Congress to overlook existing law and save billions by combining the two operations instead of building a new plutonium production reactor.

Kitty Tucker and Mark Robinowitz are with the Health and Energy Institute, 236 Massachusetts Avenue N.E., Suite 506, Washington, DC, 20002. Phone: (202) 543-1070.

Another Bhopal at Fernald?

The January 4 accident in which a worker was killed and 30 others injured by uranium hexafluoride gas (UF₆) released from a burst tank at Sequoyah Fuels Corporation near Gore, Oklahoma, received much publicity, as though it were a rare one-of-a-kind event. Actually a series of similar accidents have occurred at the Feed Materials Production Center in Fernald, Ohio.

Only two weeks after the worker died in Oklahoma, an accident involving the same gas occurred at the Fernald plant. A tank of UF₆ started leaking, but detectors intended to catch such a leak failed and the escaping gas went unnoticed until an alert worker saw the white plume and acted promptly. The alarm was sounded and the room evacuated. No injuries were reported. Since the gas detectors did not work, the company can only guess that 20 to 40 pounds of gas were released. Last April a similar leak occurred at the same pilot plant and released 8 pounds of hydrofluoric acid. During cleanup of that mishap, two pounds of the highly corrosive acid accidentally went into a storm sewer.

A more serious accident involving uranium hexafluoride occurred at the Fernald plant in 1966 when the valve of a ten-ton tank was twisted off and a large quantity of the gas escaped during the hour before pressure in the tank subsided enough for workers to plug the hole. One worker was hospitalized and others placed under observation.

Although at least three accidents involving uranium hexafluoride have already occurred at the Fernald plant, the Department of Energy and the company managing the plant insist that they can't happen. A 1985 report issued by National Lead of Ohio, the

company in charge at Fernald last year, declares that a release of 30 pounds or more of uranium hexafluoride (UF₆) has "a probability of occurrence of once every 10,000 years." The report also concludes that a release of even 15,000 pounds of UF₆ "would cause no significant health effects [off-site]." The report does not mention on-site effects. At the Kerr-McGee's Sequoyah Facility in Oklahoma, the ruptured cylinder contained 14 tons of this toxic gas.

Another plant handling UF₆, Allied Corp's Metropolis, Illinois conversion plant, had an overpressurization incident, almost identical to the Kerr-McGee accident, but without the rupture, on December 7, 1984. Workers at Allied were also involved in reheating a 14 ton UF₆ cylinder. The February 10 issue of *NuclearFuel* relates that the overpressurization incident was not even reported to the Nuclear Regulatory Commission.

"I'm worried about the possibility of a catastrophic accident," says Tom Carpenter, of the Government Accountability Project (GAP), a public interest group that is monitoring health and safety practices at the plant. "Because of the condition of the chemical tank farm and the record of poor management and technological failures, conditions are ripe for something really bad. A series of small accidents not only contributes to the build-up of contamination, they are also warning signs that Ohio citizens had better prepare for the worst."

A DuPont Company evaluation of the Chemical Tank Farm last year states that the design at the Feed Materials Production Center (FMPC) is antiquated and inadequate even by 1950's standards. Last fall striking workers demanded better health and

safety conditions and more reliable monitoring at the plant. (See article in Fall '85 *Waste Paper*.) The FMPC, operated by Westinghouse since January 1986, plans to expand. Local groups are asking the Federal government to perform an Environmental Impact Statement on the proposed expansion and requesting that the state implement evacuation plans for the area.

At the Ohio plant, uranium hexafluoride gas, is converted into solid uranium tetrafluoride and then into uranium metal. This metal is then bombarded with neutrons in DOE reactors at the Savannah River Plant, South Carolina, and Hanford, Washington, to produce plutonium for nuclear bombs. When uranium hexafluoride comes in contact with water vapor in the air it immediately turns into a highly corrosive substance, hydrofluoric acid, with smaller amounts of radioactive gases mixed in. In the January 4 accident in Oklahoma, one worker died from extensive lung damage caused by the hydrofluoric acid. Thirty other workers who breathed the acid received less exposure and were not expected to suffer long-term health effects.

Urine samples taken from these workers soon after the accident, however, showed that many had up to 100 times the amount of uranyl fluoride normally found in residents around the plant.

Dr. Carl Bogardus, director of radiation therapy at the University of Oklahoma said that the main concern with these workers is that they could develop some irreversible kidney damage. If too much uranium gets into the kidneys, it could permanently destroy cells, he said. It is also possible, he reports, that a type of long-lasting uranium particle could lodge in their lungs and cause damage, but this would not become apparent for some time.

New York Runs To Campaign Party

More than 200 people ran to the Radioactive Waste Campaign's new offices on January 9 to welcome the Campaign to New York City.

Long-time friends of the Campaign such as Congressman Ted Weiss, Brooklyn D.A. Liz Holtzman, Assemblymen Pete Grannis and Dick

Gottfried, *Radwaste* author Fred Shapiro, MOBE's Tom DeLuca, WESPAC director Connie Hogarth, Charlie Komanoff, energy consultant, Sierra Club NYC Chair Jean Kozlowski, and our truest friend of all, former Campaign Director Mina Hamilton, all gathered to cheer the

Campaign on in its work.

Environmentalists and peace activists mingled with reporters and musicians and other friends of the Campaign in a festive break from our usual hell-raising, hair-raising, and fund-raising to good, plain fun-raising. Said Fred Shapiro, "Radioactive waste is addictive. We're all in it for life."

Regional Compacts

South Dakota: Stubbing the Chem-Nuclear Toe

by Jim MacInnes

Chem-Nuclear had an urgent need: their multi-state low-level radioactive waste (LLRW) landfill at Barnwell, South Carolina, was soon, by state decree, to be limited to in-state waste and ultimately closed. When Chem-Nuclear was taken over by Waste Management, Inc., the nation's largest handler of toxic waste, Chem-Nuclear's new president said that the company needed to "double our size in sales." Not easy to do, unless a new site could be found.

Imagine their interest, then, in news reports indicating that an official of South Dakota's Department of Water and Natural Resources had told projected Midwest Compact members in the summer of 1982 that his state was interested in hosting a LLRW site!

South Dakota's Governor William Janklow roundly denied the story, saying that South Dakota would never accept imported waste. Six months later, however, the Midwest Compact bill was introduced into the

state legislature with South Dakota as the host state.

In the meantime, a group representing real estate interests of an economically depressed former uranium mining town in southwest South Dakota invited Chem-Nuclear to study the possibility of locating a LLRW site at Igloo, an abandoned Army munitions depot six miles south of the town of Edgemont. The planned facility would take one-third of the nation's low-level waste, storing up to one million cubic feet a year and creating about 100 jobs.

When the 1983 legislature did not pass the Governor's Midwest Compact bill, but established an interim study committee instead, Chem-Nuclear began a public relations barrage. Company representatives claimed that the Igloo site was ideal and tried to make visions of dollar signs dance in the legislators' heads. A company-produced supplement, authorship admitted in the finest of fine print, appeared statewide. So did their half-hour TV "documentary." They offered legislators, repor-

ters, and some others free trips to witness the wonders of Barnwell.

Some folks wondered why their state, which produces less LLRW than any other state (seven cubic feet annually) should consider hosting a large regional or national site. In the summer of 1983, some twenty organizations, including the SD Sierra Club groups, formed the Nuclear Waste Vote Coalition (NWVC). The goal was to pass a law giving state voters the power to approve or reject LLRW compacts and disposal sites.

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Midwest Compact: Consultant Discourages Incineration

The message from 4,000 citizens at a Fayetteville, North Carolina hearing sponsored by the NC Department of Human Resources in mid January was clear. Citizens don't want to breathe in radioactivity when other alternatives to reduce the volume of radioactive waste are available. A new study by consultants for the Midwest Compact Commission agrees, seeing more advantages for compacting than incinerating radioactive waste.

Written as part of the Radioactive Waste Plan of the Midwest Compact Commission, the report by Rogers and Associates lists several disadvantages of incineration, some of which were obvious to citizens in North Carolina: radionuclides may be released to the environment, and an incinerator "may be considered undesirable by neighbors." **A less publicized but important concern: radioactive ash, being water soluble, is a poor waste form and may leach out in a landfill.**

In investigating all waste produced in the Midwest Compact region, comprising Minnesota, Wisconsin, Missouri, Ohio, Michigan and Indiana, Rogers and Associates concluded that a supercompact could reduce volumes by as much as 20%, while an incinerator could do better, 32%, providing the radioactive ash and scrubber solutions were not solidified. Producing a better final waste

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Appalachian States Compact: Pennsylvania Governor Signs Bill

by Jeff Schmidt

Pennsylvania will host a "low-level" radioactive waste facility under terms of the Appalachian States Compact, signed into law on December 22. When Pennsylvania rejected the proposed thirteen-state Northeast Compact, administration officials decided instead to enter into a much smaller compact, which would give the state a greater degree of control.

A state that produces one-tenth of the nation's "low-level" radioactive waste, Pennsylvania could not realistically expect to send its waste to a neighbor. The Appalachian Compact is open to Delaware, Maryland, New Jersey, New York and West Virginia, though only West Virginia and Delaware will probably join. Maryland is a maybe.

Key provisions of interest to environmentalists include: ban on importing waste from outside the compact area except in emergencies . . . requirement that waste be monitored for its full hazardous life . . . mandatory fines and possible suspension of facility use for violators of facility rules and regulations . . . extended care clean up fund to be provided by generators, not taxpayers . . . ban on shallow land burial.

The next step in Pennsylvania is the introduction of the siting law or enabling legislation. It is expected to establish the process for 1) site suitability screening, 2) final site selection, and, 3) selecting the technology and operator.

Jeff Schmidt is the Sierra Club lobbyist in Pennsylvania and a member of the Waste Campaign Steering Committee.

Plutonium at West Valley— See How it Runs

by Carol Mongerson

Nuclear waste never seems to have a permanent home. Like wandering nomads looking for an oasis, it moves from one temporary location to another. Plutonium-contaminated waste, stored in tanks at one of two burial grounds at West Valley is on the move again.

When 1,000 gallon tanks containing plutonium-contaminated kerosene, seasoned with tributyl-n-phosphate, were buried in deep holes in the NRC-licensed burial ground beginning 1969, the operator, Nuclear Fuel Services (NFS), claimed the waste would migrate only 1/4 inch per year once the tanks were breached. If they had been right, plutonium would have migrated only three inches. But in 1983, plutonium-contaminated kerosene was discovered in a monitoring well, 60 feet from the closest tank.

Once the tanks were breached, plutonium-contaminated kerosene floated up and down with the water table, moving laterally six to twelve feet below the surface, at a juncture of two clays. Westinghouse (under contract with DOE to clean up West Valley) quickly drilled a number of wells to identify the source and extent of the leak, and to draw off kerosene and excess water. About 1,200 gallons have been pumped from wells around the burial ground. This turns out to be only an early chapter in a tale without an end in sight.

Five holes, each containing four 1,000 gallon tanks are buried at West Valley. A radioactive plume moving from the tanks toward a nearby ravine and the Cattaraugus Creek water shed has been identified.

Thinking that two of the five holes are responsible for the plume, New York State is providing funds, presently estimated at \$1 to \$1.5 million to exhume these. The exhumation process involves sinking 30 foot piles and scooping earth with a clam. Local residents are fearful that the carbon steel tanks, which may be badly corroded, will be punctured by these 19th century techniques. In 1980, the New York Department of

Health called for exhumation of the entire burial ground, but exhumation of the remaining three holes awaits more detailed information on the status of the first two, and the difficulty of exhumation using these crude techniques.

After discovery of the plutonium leak, the NRC contracted with Oak Ridge National Laboratories (ORNL) to do two studies on the West Valley burial ground. ORNL I, released fall 1984, examined data collected by Westinghouse and recommended drilling more wells and retrofitting some existing wells to give more accurate information on the depth at which plutonium is migrating. The study also recommended drilling wells around the remaining three holes, which contain higher levels of radioactivity, to see whether these tanks are leaking as well.

One revelation from the ORNL I study was particularly disturbing, the discovery of an old trench leading from the burial ground toward the creek. Though now filled in, this disturbed soil could provide a more rapid pathway for migration. The soil at this part of the burial ground was found to be very unstable; the walls kept collapsing. Clearly there is no "impenetrable clay barrier" between the burial ground and the watershed, a favorite reassurance given to uneasy citizens. The second study, ORNL II, issued fall 1985, called attention to the shocking lack of knowledge underlying decisions about waste at West Valley. Filling in the identified areas of ignorance too vast to be called data gaps will require as much as \$1.5 million and five years' research, including characterization of the entire burial ground. ORNL II notes, for example, that there is evidence of downward movement through fractures in the deep unweathered till toward an extensive permeable gravel stratum 70' below the burial ground. Most burial holes are 50' deep. Radioactivity at the 70' level would migrate laterally very rapidly. The possibility of this happening was pointed out by *the Waste Paper* seven years ago. The leaking plutonium-contaminated kerosene may also reach areas of the burial

ground containing large amounts of radioactivity, where irradiated fuel hardware and damaged fuel rods are buried. Kerosene may dissolve this radioactivity more effectively than water and carry it towards the ravine. Also, the leaking kerosene can alter the structure of the clay, preventing the counted-on binding of radionuclides to the soil, and create pathways for migration of additional radioactivity out of the burial ground.

While plutonium-contaminated kerosene migrates, exhumation of tanks proceeds, and DOE continues to study the problem. Meanwhile, area residents fear that West Valley will become the burial ground for waste generated by its own cleanup. The DOE project to solidify liquid high-level wastes at West Valley will generate much "low-level" waste. What will DOE do with that? An Environmental Review which discusses possible options has been under wraps in Washington since last September. Pressured by a FOIA request by the Campaign, DOE says it will release the Environmental Review in February. Citizens have suspected that DOE is trying to withhold publication of the Environmental Review until NYS legislation on low-level waste is enacted, possibly in March. Along with this, comes the suspicion that DOE wants to pass the wastes from the Federal cleanup project off to the State of New York. To be placed where? In a low-level waste facility the State intends to develop at West Valley! If NYS legislators read it and learn that DOE project wastes will include plutonium-contaminated waste, with hazardous lives on the order of tens of thousands of years, they might (could we hope?) tell DOE to take away its garbage.

ACTION: To find out what DOE intends to do with "low-level" and plutonium-contaminated wastes from the high level waste project at West Valley, write to Tom McIntosh, West Valley Program Office, US Department of Energy, Washington, DC 20545, and ask for a copy of the environmental review of options for disposal of project-generated waste.

Carol Mongerson, a member of the Radioactive Waste Campaign Steering Committee, is a founder of the Coalition on West Valley Nuclear Wastes, and has been active on West Valley issues since 1974.

Tennessee Communities Bear Price of National Defense

by Joanne Thompson

Ever since World War II, under the protective umbrella of national security, nuclear facilities at Oak Ridge, Tennessee, have operated with minimal outside scrutiny. Companies under contract with the federal government have been able to get legislative and agency waivers to continue operations, while at the same time refusing to disclose their methods of handling and disposing of radioactive and toxic materials. Only in the recent past have citizens been made aware of the true extent of the problem. In 1983, local media exposed the fact that the Y-12 weapons facility illegally released over 2.4 million pounds of mercury into the environment during the many years the facility had been in existence. Mercury poisoning causes nerve and brain damage, and birth disorders.

The transformation of Oak Ridge from a backwoods community to the center of weapons research and production was never questioned at the time. In the 40's, the country was at war. Security was tight and who could argue with 80,000 federal jobs being brought to east Tennessee.

Oak Ridge and surrounding communities became dependent on the federal government to sustain the local economic base. With Oak Ridge jobs now down to 10,000, former workers developing cancer, and landfills contaminating groundwater supplies, the price of national defense is just now being realized.

The recognition of the federal government's failure to be accountable to its citizens comes at a time when the DOE is proposing to make Oak Ridge the site for the first facility to re-package and store high level radioactive waste (see *the Waste Paper*, Vol. 7, No. 2, Fall 1985). DOE proposed the development of this facility at the same time it announced the shut-down of the Oak Ridge Gaseous Diffusion Plant, effectively laying off over 2,000 workers. The promise of jobs to help the local economy has always been the "big carrot" in reducing local opposition.

Track Record

Tennesseans have grown increasingly skeptical that DOE can indeed construct and operate such a facility safely in light of its own track record on worker health and environmental

damage. While DOE officials claim that there are minimal worker risks at their facilities, there is increasing evidence to the contrary. A paper by Bob Alvarez of the Environmental Policy Institute documents serious occupational health problems at Oak Ridge facilities:

- leukemia mortality at the Oak Ridge National Laboratory - workers in maintenance jobs who worked less than 10 years show a 91% increased risk of leukemia. Those who worked longer showed a risk 212% greater.

- cancer mortality at the Oak Ridge Y-12 weapons plant - research found that the risk of brain tumors for workers employed 5 to 10 years was 489% greater than expected. Leukemia and aleukemia risks were 900% greater than expected.

An October 11, 1984 issue of the *New Scientist* indicated additional problems:

- overall, workers at the Oak Ridge National Laboratory have a 49% excess leukemia mortality compared to the general public;

- janitors, laborers, maintenance men and construction workers at the Laboratory have a significant excess risk of radiation-associated cancers;

- between 1943 and 1947, workers at Oak Ridge's Y-12 uranium processing plant had "significant excesses of deaths from lung cancer when compared to US white male rates;"

The Oak Ridge Reservation: A History of Problems

by Debra Castaldo

The Oak Ridge Reservation (ORR) located in Oak Ridge, Tennessee, is owned and operated by the US Department of Energy (DOE). The ORR includes three plants: Y-12 Plant, Oak Ridge Gaseous Diffusion Plant (ORGDP) and Oak Ridge National Laboratory (ORNL).

The Y-12 and ORGDP plants produce nuclear materials for research and development and national defense. ORNL is involved in research and development. The Y-12 plant has four major responsibilities: (1) production of nuclear weapons components, (2) processing of source and special nuclear materials, such as highly enriched uranium, (3) support for weapons-design laboratories, and

(4) support to other government agencies. Activities include the production of lithium compounds, the recovery of enriched uranium from nonirradiated scrap materials, and the fabrication of uranium and other materials into finished parts and assemblies for use in the plutonium production reactors at the Savannah River Plant.

The ORGDP is a complex of production, research, development and support facilities located at the western edge of the City of Oak Ridge. The primary function of ORGDP is the enrichment of uranium hexafluoride (UF₆) in the uranium-235 isotope. Extensive efforts are also expended on research and development associated with laser isotopic separation and the gaseous diffusion

and gas centrifuge processes. DOE is closing down the production of UF₆ at ORGDP.

ORNL is a large multi-purpose research laboratory. Facilities consist of nuclear reactors, chemical pilot plants, research laboratories, radioisotope production laboratories, and support facilities.

Hazardous wastes, such as lead, cadmium, methylene chloride, thorium, uranium, perchloroethylene, mercury, and various radionuclides contaminate local groundwater. Fifty-one million pounds of uranium are buried at the ORR. One of the main pathways of pollution to humans is through drinking water supplies. Water that drains the ORR enters the Clinch River and is subsequently conveyed to the Tennessee River at Kingston, Tennessee (see figure). The Clinch River is the source of most water used in the Oak Ridge area. Water supplies for Clinton, Oak Ridge, Kingston and DOE facilities

- workers at Oak Ridge's Y-12 plant had "excess death from cancer of the lung, brain, and central nervous system, Hodgkin's disease and other lymphatic tissue;" and

- workers at Oak Ridge's Gaseous Diffusion Plant exhibit "excess deaths due to lung and brain cancers and respiratory disease."

In addition, a study of 19,000 women working between 1943 and 1947 at the Y-12 plant was never finished—officials claimed that it was difficult to follow up on research subjects who did not have Social Security numbers and changed their names upon getting married. In late 1985, DOE officials announced that 9 years of health data of workers had been destroyed or lost.

During the mercury investigation, it was discovered that workers at the Y-12 plant during the 1950's breathed doses of mercury vapor as high as 30 times the prevailing health standards.

The track record for environmental damage is as scandalous. In addition to the 2.4 million pounds of mercury illegally released into the environment, we have the following:

- Over 12 million cubic feet of low-level radioactive waste was buried at the Oak Ridge Reservation since WW

II—enough to fill the 95,000 seat University of Tennessee football stadium;

- TVA has identified more than 140 dangerous chemicals and radioactive materials present in Oak Ridge creek bottoms, including lead, cadmium, methylene chloride, thorium and perchloroethylene;

- Over the years, DOE engaged in poor disposal practices, including dumping wastes into poorly sited and constructed trenches and ponds which have resulted in serious underground water contamination;

- In 1985, DOE admitted to having dumped over 50 million pounds of uranium chips into Dempster Dumpsters and then burying them in shallow trenches;

- In an 8 year period, DOE has had 740 NPDES violations at its three Oak Ridge facilities; and

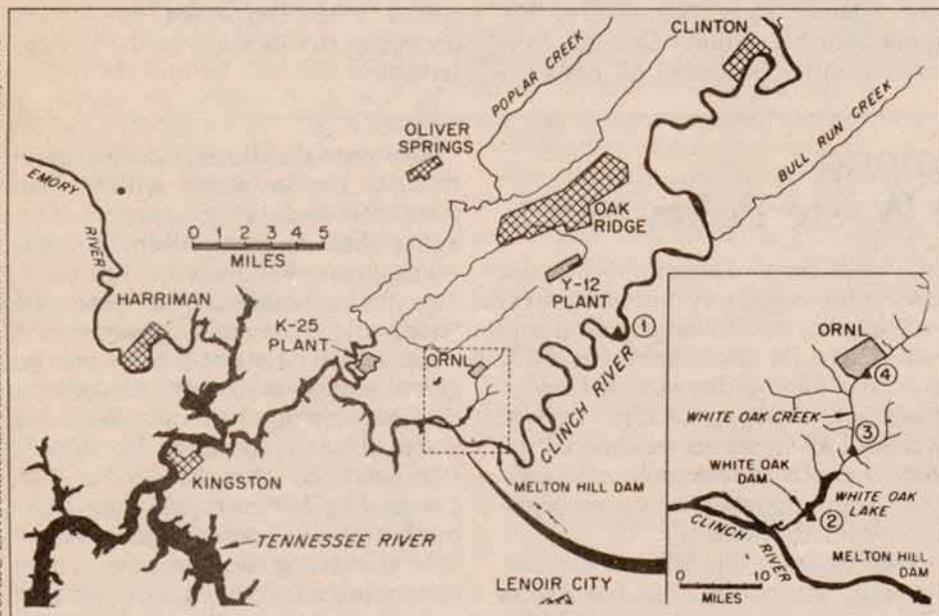
- Recent spills of strontium-90 resulted in shutting the water intake system for the City of Kingston. City officials were notified one day after DOE had notified workers at the Gaseous Diffusion Plant not to use the water.

Notwithstanding other unknown dangers, DOE has estimated that the cost for clean-up of their facilities will run to over \$800 million. As recently

enacted laws, such as the Resource Conservation and Recovery Act, and Superfund Law (CERCLA), and recently promulgated standards, such as National Emission Standard for Hazardous Air Pollutants, are applied by the federal and state EPA's, more information will become known about DOE past disposal and operating practices.

The Tennessee Valley Energy Coalition (TVEC) is one Tennessee citizen organization leading the fight to keep the proposed temporary nuclear waste facility out of Tennessee and to make DOE correct past sins before proceeding with any new projects. TVEC has recently organized Americans for a Clean Environment, a local group which is monitoring past and future DOE activities at Oak Ridge. The organizations recently delivered petitions to the state capitol representing the opposition of over 100,000 Tennesseans to the MRS facility. The Sierra Club Radioactive Waste Campaign is working with TVEC, the Highlander Center, Tennessee Chapter of the Sierra Club, and other Tennessee groups to halt the spread of groundwater contamination from Oak Ridge facilities.

Joanne Thompson, Ph.D., is executive director of the Tennessee Valley Energy Coalition and adjunct faculty with the University of Tennessee School of Social Work.



Landfills and operating facilities at the Oak Ridge Reservation contaminate local streams which feed the Clinch River.

are drawn from the Clinch River. In addition, waste waters from ORR are discharged directly and indirectly by a system of tributaries into the Clinch River.

Water analysis of the Clinch River shows the water quality to be highly

turbid. Cadmium, copper, iron, lead, mercury, nickel, silver and zinc concentrations all exceed EPA criteria for protection of aquatic life. Iron and manganese exceed drinking water standards. ORNL was issued a notice of non-compliance by the State of

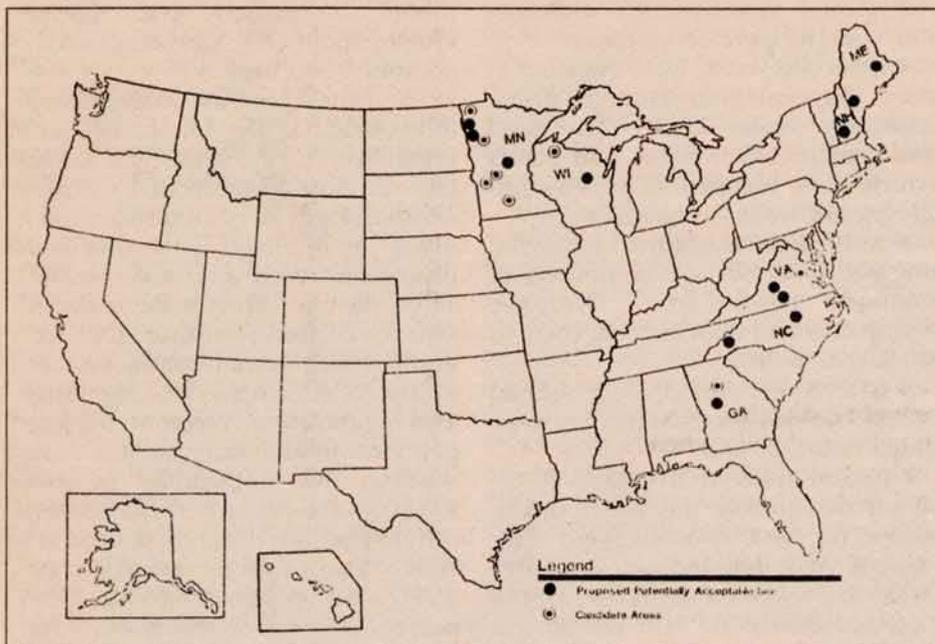
Tennessee (Oct 26, 1983) for water pollution violations. In December 1985, strontium-90 levels in the Clinch River exceeded even DOE's lax standards, and water intakes for the City of Kingston were shut down.

DOE is considering centralizing the ORR waste disposal facilities. Currently each facility has its own disposal area. Proposals for a central waste disposal facility for all ORR plants favoring a trench system have been published in a Draft Environmental Impact Statement September 1984. Since the permeability of the soils is quite low, the landfill alternative is favored over an above ground system. But the hydrogeology of the site is quite complex, and migration is difficult to predict.

Debra Castaldo is a freelance writer with 10 years experience in private industry and state/federal government environmental management programs.

DOE Points the Finger

Candidates for High Level Waste Site in the East Announced



High-level waste repository: Potentially acceptable sites and candidate areas proposed by the Department of Energy.

On January 16, seven new states were added to the high level waste sweepstakes, chosen by the Department of Energy (DOE) as potential sites for the second deep under-

ground repository. The lucky seven candidates for a second repository are: Maine, New Hampshire, Virginia, North Carolina, Georgia, Minnesota and Wisconsin. All have un-

derlying crystalline rock formations. Citizens and environmental groups in these states are already organizing to attend public hearings during the initial 90 day response period. Conspicuous by their absence are South Carolina and Vermont. Twenty-five hundred people at a Montpelier, Vermont hearing last summer (the capitol only has 8,000 residents!) was a signal to DOE. And South Carolina? It has the same geological formation as North Carolina and Georgia, so technical considerations were not the factor in ruling it out. With most of the commercial low level waste at Barnwell, and military waste at the Savannah River Plant, and an influential US Senator, Strom Thurmond, DOE probably thought it best to let sleeping dogs lie.

The DOE is already investigating Washington, Nevada and Texas for the proposed first repository. The final Environmental Assessments are due out in April. Also up for consideration, in early February, is DOE's authorization request to Congress for a centralized "temporary" storage facility near Oak Ridge, Tennessee. A court victory by Tennessee in February may throw a monkey wrench into the timing. The State successfully argued that DOE had not consulted with Tennessee before announcing the location of the storage facility.

Congress Rushes to Amend Low-Level Radioactive Waste Policy Act

Just nine days short of the January 1, 1986 deadline after which the three states currently hosting low-level waste (LLW) dumpsites could have closed their doors to out-of-state wastes, Congress amended the Low Level Radioactive Waste Act to grant a seven year reprieve.

In their rush to adjourn, the House scrapped H.R. 1083, an improved version of the original amendments proposed by Representative Udall, which the Sierra Club strongly supported, and accepted the weaker Senate version.

The 1985 Amendments Act does contain some provisions sought by environmentalists. It requires the Nuclear Regulatory Commission (NRC), within one year, to develop criteria for licensing LLW disposal methods other than shallow land bu-

rial, and continues joint NRC and EPA joint regulatory authority over "mixed wastes", toxic chemical and radioactive. It also establishes NRC licensing for the disposal of Department of Energy (DOE) "orphan wastes", all waste above class C, the very long-lived category of LLW. This is an important new area of authority for the NRC.

Missing from this bill was a clause strongly supported by the Sierra Club, requiring commercial LLW, class C or greater, to be disposed of in a deep underground repository. Key House leaders in this battle, Representatives Udall and Markey, in a Floor colloquy written by Club lobbyist Brooks Yaeger, expressed the view that the DOE study of class C+ wastes should include a study of what to do with class C LLW.

The new deadlines established in the Act require states without disposal sites to develop a plan for managing their wastes within the next seven years. Penalties for not meeting the milestones on time are specified. For instance, generators in states which have not entered into regional compacts or certified their intent to develop their own low-level waste disposal facilities by July 1, 1986 may be charged double surcharge fees between July 1 and December 31, 1986, after which time access to existing disposal sites would be terminated. By 1993, all states and regions must assume responsibility for disposing of their own wastes.

Something New: To eliminate conflict and confusion with other like-named publications, the former *Waste Paper* has officially become *The Sierra Club Waste Paper*. New masthead thanks to Betty Quick.

Environmentalists Turn Industry "Expert"

The Waste Campaign and the Pennsylvania Chapter Sierra Club were recently shocked to discover that a West Coast Sierra Club member was working to undercut Club efforts to block a radioactive waste incinerator in Parks Township, Pennsylvania, near Pittsburgh. Ruth Weiner, of the Cascade Chapter (Washington State) Sierra Club had been hired by Babcock and Wilcox to endorse their proposed "low-level" incinerator planned for this small community about 20 miles from Pittsburgh.

Weiner, who served as Conservation Chair of the Cascade Chapter was reported by local media to have received \$2,400 plus expenses for her trip to Pennsylvania where she spoke glowingly about the incinerator proposal to local media at a company-sponsored "open house" that was closed to the public.

Weiner, a Professor of Environmental Science at Western Washington University, made no attempt to contact Club officials prior to her appearance at the company media event. When Babcock and Wilcox used her Club affiliation in a press release, Weiner made no attempt to repudiate such an improper use of the Club name. Pennsylvania Sierra Club officials, alerted by a friendly reporter, asked Weiner not to appear, but were ignored.

The obvious concern of local environmentalists was that Babcock and Wilcox was attempting to falsely create the impression that the Sierra Club was divided on this issue (it is not). Physicist Marvin Resnikoff has authored a 34-page report detailing concerns about radioactive and chemical emissions. The company denied portions of Resnikoff's find-

ings, but the tactic of hiring a Sierra Club volunteer leader to dispute other aspects was, to say the least, a novel approach.

This is not the first time Ruth Weiner has openly worked at cross purposes with other Club representatives. During Congressional hearings on amendments to the Low Level Waste Policy Act, Sierra Club New England Chapter staff, Priscilla Chapman, who was presenting testimony on behalf of the national Club, was subjected to a surprising line of questioning by a Representative from Washington State. The Rep stated that the Sierra Club did not appear united on the policy being enunciated. In particular, there seemed to be differences with the Cascade Chapter. Minutes earlier, Ms. Weiner was seen huddled with the Congressman and his aide. On another occasion, after being given a tour of the government's reprocessing operation at Hanford, Washington, Ms. Weiner was quoted in the Tri-City Herald as being favorably impressed by the operation. Again, her Sierra Club affiliation was displayed in the media. The Hanford reprocessing plant separates plutonium for use in nuclear warheads.

We have to ask ourselves when a Club member starts to articulate, publicly, positions in opposition to carefully developed Club policy, what went wrong? Was the individual "hurt" by some previous experience within the Club? Where is the Club loyalty we strive so carefully to achieve? Can environmentalists be so easily bought? What are the steps we should take collectively to prevent such defections in the future? (Any responses from our readers would be appreciated.)



Photo by Zach Lyons

Dana Lyons on the road with his homemade radioactive waste transportation system.

Singing the Highway Blues

Songwriter and musician Dana Lyons is on the road with a load of mock nuclear waste. February isn't a glorious time for traveling Interstate 90, as he's doing, but that's the point. Dana wants to draw attention to the transportation hazards that will multiply when high level waste from around the country begins to be shipped to the planned national repository. If the repository is located in Hanford, Washington, I-90 will be the major transportation route with conceivably a truckload of waste traveling the highway every hour.

Dana's itinerary, which began in Boston and will end in Hanford, includes stops at 30 communities and fire stations along the way to ask how they would respond to an accident on I-90 involving nuclear waste.

"Our State is a Dumpsite," one of Dana's compositions, has been proposed as Washington's official state song by opponents of the proposed repository at Hanford. Its refrain:

*"Our state is a dumpsite,
we'll take whatever you send
Our state is a dumpsite,
where the hot times never end,"*

may never be whistled in the Chamber of Commerce, but it's getting wide radio play around Dana's home state.

Dana, who will be happy to sing, play and speak for interested groups along the route, can be reached through Duane Dorn (206)634-1226.

Department of Glowing Ideas

In addition to shooting it into space, other bright ideas on what to do with radioactive waste continue to shine:

1. The Department of Commerce conducted a study in Minnesota on the possibility of using radioactive waste to melt highway ice and snow.

2. The National Lampoon proposes tupperware containment.

Nor does the DOE lack the ability to look on the bright side of things: When told the results of a referendum in Wisconsin in which 89% of the voters opposed a repository in their state, DOE responded that they were very encouraged by the 11% who favored a site.

Resources

No Immediate Danger: The People of Canonsburg



Photo courtesy of Joan Engel

Madame Curie tours the world's largest radium processing plant, Strabane, Pa., May 1921.

Review by Bernard Timberg

Joan Engel and Gerald Saldo are independent filmmakers. Joan grew up in Canonsburg, Pennsylvania, and found out on a visit home that she and her sister, and her sister's family, and 8000 other residents of Canonsburg, had been living on a time bomb—a radioactive landfill, hastily buried in the late 1950's and covered by an industrial park and a baseball field that had been leaking radon into the surrounding community for almost 30 years. Forty years before that, in the early 1920's, a radium processing plant had already introduced high levels of radiation in the area. When the plant closed down, people from all over town picked up radioactive objects: like a great iron pot, used ever since as a water basin in one homeowner's backyard. While the town had been plagued by a series of severe health problems—high rates of blood and lung cancer, serious urinary, gynecological and lung disorders and infections, until the 1970's no one had linked those problems with the former plutonium site and landfill. Most people didn't even know that the "rare metals" company that had been in their midst had processed radioactive materials.

No Immediate Danger documents the town's growing awareness of the problem. The title echoes the DOE's response to their questions and calls for a comprehensive health study. The struggle to get state and federal officials to acknowledge the existence of a problem and give the town some indication of the risks that were facing, and would continue to face, was spearheaded by a small number of individuals and a group called U-CARE (United Citizens Awareness to Radiation Exposure), of which Joan Engel's sister Agnes was one of the founders.

The half-hour videotape produced over the years 1979 to 1982 came about almost entirely through the Engells' and Saldos' own effort and resources plus a small grant (from Downtown Community Television in New York). It is extremely well-made, with thoughtful choices on both artistic and political levels. While the work has won several well-deserved awards at film festivals, it is more than a satisfying artistic experience: it is an effective organizing tool that documents the experience of ordinary small town folks coming to grips with a fearful poison in their midst. It proudly shows the energy, determination and courage of a number of ordinary people who found themselves in this situation.

Like these people, the documentary admits that the problem has not been solved and concludes with the words of one resident who became active in the struggle.

In January, *60 Minutes* also reported on Canonsburg (and relied heavily on *No Immediate Danger* for its research). The *60 Minutes* report brings the story up to date: by the end of 1985, the DOE and the state of Pennsylvania had finally moved to seal the landfill, at a reported cost of \$30 million. But the television report leaves the viewer with a more superficial view of the problem. It does not discuss longterm genetic damage, or health effects other than lung cancer, or the sustained community effort over an eight-year period that finally led government officials to act. In fact, the TV version features one lone citizen crusader who appears to have brought about a satisfactory solution to the problem almost by herself.

The national media has formulas to headline a problem, wrap it up and move on. The people who live in Canonsburg don't have that luxury. What makes *No Immediate Danger* such a powerful tape is that it discusses the issue—in all its scientific and ethical complexity—from inside. Although expert testimony is heard, the voices of experts are not superimposed over the voices and concerns of the people who live in the community.

No Immediate Danger is available through Engells and Saldo. Requests may be addressed to *No Immediate Danger*, 43 Spring St., NYC, 10012 (212-925-0403).

Bernard Timberg teaches film and video production at Rutgers College, Newark.

Corrections

Research for an article in the *Fall Waste Paper* on the proposed Monitored Retrievable Storage Facility in Tennessee was done by Joanne Thompson. We regret she was not credited.

In the article on low-level waste siting in Texas, the **Nueces River Basin**, not the **Vmonor River Basin**, is the correct location mentioned in paragraphs six and seven.

The Nuclear Waste Primer: A Handbook for Citizens

Review by Harold Berger

The Nuclear Waste Primer is meant to present a balanced overview, to the non-expert, of the issues surrounding the disposal of nuclear wastes in this country. The ninety-page book offers basic background information in simple and concise terms: the types of nuclear waste; its production (including a simple explanation of the nuclear fuel cycle); those responsible for its production, handling, storage, and ultimate disposal; the liabilities these groups face in the case of accident; and the dangers posed by nuclear waste.

As might be expected from a handbook prepared by the League of Women Voters, it contains concise summaries of relevant legislation as well as chapters on the politics and policies of waste management. It also has a glossary of terms useful for the neophyte and a listing of publications and organizations involved on both sides of the issue.

In my opinion, the book's last chapter, "A Role for Citizens", is one of its best. It sets out a detailed explanation of how citizens can get involved in nuclear waste decisions which will affect them. For example, the book suggests discovering what officials are involved in these decisions and what qualifications they may have, commenting on proposals through the media or at hearings, or simply joining groups or subscribing to publications which monitor waste disposal decisions.

Unfortunately, in its attempt to present a "balanced" viewpoint, the *Primer* leans heavily on the current official thinking and provides only a minimal sense of the scope and seriousness of the opposing positions. For example, it gives the impression that technology has the waste disposal problem well in hand and that the main obstacles to a permanent nuclear waste repository are political. It even takes seriously the idea of shooting nuclear waste into space. Its

list of publications is almost half government documents and doesn't mention any of the notable recent studies such as *Radwaste*, *Forevermore* or *The Next Nuclear Gamble*. (Furthermore, while advising potential activists to subscribe to publications, it never mentions the *Waste Paper!*) So, while the *Primer* could be a useful introduction to nuclear waste facts, its presentation of the problems and controversies is fuzzy, and that's exactly what the concerned citizen needs to understand. [Editor's note: Perhaps the fact that the Department of Energy financially supports the League of Women Voters Education Fund has a role in its perspective.]

The Nuclear Waste Primer: A Handbook For Citizens is published by Nick Lyons Books for the League of Women Voters Education Fund and is distributed by Schocken Books, 62 Cooper Square, New York, NY, 10003. The book's cost is \$5.95.

Harold Berger holds a MA degree in political science and environmental policy and is currently working as a volunteer for the Radioactive Waste Campaign.

International News Source

The World Information Service on Energy (WISE) is now mailing copies of its *News Communiqué* in English from Amsterdam by air directly to US subscribers.

The bi-weekly publication covers major developments in energy news, with emphasis on the activities of safe energy organizations. A recent issue, for instance, included background information of the UF6 accident in Gore, Oklahoma, and accounts of a planned radiological survey in the Marshall Islands, a communal heating system with heat-pumps in Stockholm, and reports on radioactive waste in the UK, Sweden, Canada, and West Germany.

The articles, each of which names published sources or lists a contact, are provided by a worldwide network of safe energy activists. French and Spanish branches of the network

produce versions of the newsletter emphasizing events in their own countries.

To order the *Communiqué* in English for a year, send a check for \$35 to WISE-Amsterdam, PO Box 5627, 1007 AP Amsterdam, The Netherlands.

Storage Options – New Fact Sheet

Just when the recent (December, 1985) amendments to the Low-Level Radioactive Waste Policy Act make alternatives to radioactive landfills politically feasible, the Sierra Club Radioactive Waste Campaign is releasing a new, updated fact sheet on the subject.

"Low-Level Nuclear Waste: Options for Storage" reports on the most successful of recently developed substitutes for landfills. It reviews the Dartmouth College above-ground facility for storing research

and medical wastes on site, Ontario Hydro's waste reduction strategy, and the French method of storage in monoliths and tumuli. It also describes and critiques the Westinghouse SUREPAK, (an acronym for Subsurface Recoverable Packaging System) that is now being considered by several states. The fact sheet also explains the characteristics of the different "low-level" waste streams and shows why specific storage techniques are required for each. Photos, simple diagrams, and a glossary make it easy for the non-expert to visualize technology that, in more official documents, has a way of seeming hopelessly complicated. And it is written in everyday English.

The eight-page "Options for Storage" fact sheet can be ordered from Sierra Club Radioactive Waste Campaign, 625 Broadway, New York, New York, 10012. Single sheets are \$1.00; 25 cents each for 25 or more. Please add 22 cents postage for each \$1 of purchase.

Goodbye Seattle . . . Hello Long Beach

In the fall of last year, when the Department of Energy (DOE) informed Seattle, Washington that their city had been chosen to receive a series of irradiated nuclear fuel shipments from Taiwan, DOE wasn't thinking of Greenpeace, the dockworkers (ILWU) union, and a feisty local citizenry. But, they sure are now, as DOE beats a hasty retreat to a possibly warmer reception in Long Beach, California. On January 19, DOE informed Long Beach that they, not Seattle, will be the lucky recipients of the Taiwan shipments.

A large coalition of Seattle residents raised questions about the possibility of transportation accidents, insurance, local emergency preparedness, and more global issues concerning proliferation of nuclear bombmaking material and technology. The Taiwan fuel would be shipped in 25 ton containers or casks, two to a mixed cargo container ship. Tom Buchanan of Greenpeace pointed out that some fires on ocean-going ships can be difficult, sometimes impossible, to extinguish, and that DOE had not prepared an environmental impact statement on the consequences of a nuclear spill. Shipping casks are only designed to withstand a half hour fire. Each cask holds about ten times the long-lived radioactivity released by the Hiroshima bomb.

Since Taiwan alone has four operating commercial reactors and two more under construction, and many other countries, such as the Philippines and South Korea, have reactors, but not disposal facilities, Seattle citizens saw the Taiwan shipments as a foot in the door. As the battle heated up, the Seattle City government placed a series of safety conditions on the shipments and the ILWU dramatically announced in the beginning of January, that they would not unload the projected eighteen shipments, scheduled in 1986.

We love to get mail! Send your comments, contributions, letters to the editor, inquiries, even compliments to The Editor, *The Sierra Club Waste Paper*, 625 Broadway—2nd Floor, New York, N.Y. 10012.

Following mounting opposition and this step by the ILWU, DOE pulled out of Seattle and announced January 19, that Long Beach, California, would be the new port. Whether opposition grows in the sunnier climes of California remains to be seen.

Taiwan's four operating GE reactors, and two Westinghouse reactors under construction by Bechtel are outgrowths of the "Atoms for Peace" program inaugurated under President Eisenhower. Under this plan to encourage the use of nuclear energy, nuclear fuel has been shipped to experimental reactors worldwide since the 1950's. With these small experimental reactors, foreign countries develop the engineering infrastructure to operate large commercial reactors, the sales of which are subsidized by US taxpayers with 3% interest loans from the Export-Import Bank. But this buildup of the engineering infrastructure has become a two-edged sword. As demonstrated in India, engineers schooled in the fine art of nuclear technology are also capable of making nuclear bombs, hence the need to return the basic bombmaking ingredient contained in nuclear fuel, uranium-235, to the United States. So these developing countries are encouraged to return their used or irradiated fuel to U.S. government reprocessing plants in South Carolina and Idaho, where the weapons grade reusable uranium it contains is extracted. Like an expensive bottle deposit, when the fuel is returned to the United States, foreign countries get a credit towards the next purchase.

Citizens are becoming increasingly aware of these shipments that customarily move through ports in Portsmouth, Virginia, and, more recently, Portland, Oregon, and then on the highways. Several U.S. unions, notably railroad workers in Nebraska, United Transportation Union, and firefighters and firechiefs, have expressed concern, but none until now has taken the ultimate step of refusing to handle this dangerous cargo. In England, the International Seamen's Union refused to dump low-level waste into the sea, putting a halt to that practice.

Midwest/Continued

form, that will not leach out in a landfill, reduces the advantage of incineration. According to the Rogers and Associates report, "If the ash is solidified, a net volume reduction of 16 to 26% may be achievable."

Similar conclusions, and many more, were reported by the Radioactive Waste Campaign, in a 30 page report, now written up as an eight page fact sheet, "Radioactive Waste Incineration: What's Coming Out of the Stack?" The possible production of caustic hydrochloric acid and extremely toxic dioxin was not broached by the Rogers and Associates report, but are discussed in the Campaign fact sheet.

For copies of the Rogers and Associates report, "Regional Management Plan, Review of Alternative Waste Management Methods for the Midwest Compact Region, Report on Task 4," write to the Executive Director, Midwest Interstate Low-Level Radioactive Waste Commission, 350 N. Robert Street, St. Paul, MN 55101. The fact sheet, "Radioactive Waste Incineration: What's Coming Out of the Stack?" is available from the Sierra Club Radioactive Waste Campaign, 625 Broadway, New York, NY 10012. Single sheets are \$1; 25 cents each for 25 or more. Please add 22 cents postage for each \$1 of purchase.

South Dakota/Continued

When the NWVC gathered twice the number of signatures needed to place the LLRW initiative on the 1984 ballot, the campaign heated up. The Black Hills Sierra Club Group used the Fairness Doctrine to net the NWVC \$19,000 worth of free TV and radio time. The Sierra Club's Northern Plains Regional Conservation Committee and Dacotah Chapter sent EPA whistleblower Hugh Kaufman on a statewide speaking tour. As a result of these and other efforts, sixty-two percent of the voters approved the initiative. Even so, the 1985 legislature approved a retreaded Dakota Compact, which would permit a national site, understood to be at Igloo. A special election was authorized, under the terms of the initiative, to approve or reject the Compact.

Chem-Nuclear, having said after the 1984 election that they would not

challenge the initiative, did just that. The NWVC, knowing that the state's defense of the initiated law would be minimal, intervened, and deflected a move to make the Compact referendum non-binding. After a quiet election campaign, 83% of the voters rejected the Dakota Compact. The politicians at last got the message. Options now being explored will exclude waste importation and shallow land burial, and the NWVC is participating in the planning.

Jim MacInnes is Dacotah Chapter Conservation Co-Chair (SD) and a member of the Nuclear Energy Subcommittee.

Space/Continued

one, but two launches would be required for each disposal mission, giving us a grand total of 480,000 pounds. Thus, for each pound of waste to be disposed of, we would actually have to launch about 400 pounds.

If you're starting to suspect that it may cost a lot of money to send radioactive waste into space, you're right. In 1980, the cost for one disposal mission was estimated at \$45.7 million; the initial cost of the space equipment was estimated at \$3.2 billion. And these estimates, which must be adjusted for five years of inflation, do not include the costs of handling, transporting, and packaging the waste, much of which must be done by remote-control equipment.

A 1982 report to NASA by Battelle estimated that 750 missions would be required to dispose of the waste from used fuel rods which will have accumulated by the year 2003. The Bat-

telle estimate assumes an unrealistically small high level waste volume and weight. Before you start figuring out taxpayer costs, consider that this estimate is based on the questionable assumption that used fuel rods will be reprocessed. The remains of the West Valley plant stand as silent but deadly testimony to this country's only attempt at commercial reprocessing.

If we make the far more plausible assumption that reprocessing is not a viable option, then approximately 120,000 flights would be needed to dispose of the contents of one repository. Assuming a cost of \$46 million per flight (in 1980 dollars), the estimated cost to send aloft a full repository would be \$5,000 billion, though some "frequent flyer" discounts may be available. About 2,000 space flights per year would be needed just to keep up with the present production rate of nuclear waste. Even if all these missions were somehow carried out, in spite of the phenomenal cost and the thousand years required to launch this many shipments, we still would not have rid the earth of radioactive waste. Used fuel rods are only a part of the nuclear legacy. Left on earth would be so-called "low-level" wastes (many of which are lethal), uranium mill tailings, and all the radioactive wastes from the production of nuclear weapons, as well as all the fuel rods from nuclear power plants outside the U.S.

What about the risks? Putting radioactive waste into a heliocentric orbit would only reduce, not eliminate, the risks of putting it into a geocentric orbit. Even though the waste containers would be farther away,

radioactive particles released from collisions with meteors could still make their way back to earth. Worse, a failure of the Orbital Transfer System could result in the entire waste package returning to earth, burning up on re-entry, and releasing its radioactive contents into the atmosphere.

A launch failure would bring the waste plummeting back down to earth, and, according to the Battelle study, even that 58,800 pounds of packaging might not withstand such a fall if the payload should happen to land on hard rock. It might also land in the ocean where, if recovery attempts should fail, it would eventually corrode, releasing all its radioactive wastes. Assuming one failure in each 60 flights, the approximate missile failure rate, about 2,000 rocketships in a full repository's worth of nuclear waste, may destruct and rain an incredibly large amount of radioactivity from the sky. Despite the high failure rate for handling radioactive waste on earth, the odds in the sky are even worse. While practice might reduce the failure rate, the more waste that gets into space, the greater the risk of an outer space collision, with serious consequences.

There are no science fiction style rescue missions on the way to save the people of the earth from their follies and indulgences. On the contrary, the very fact that the U.S. government has turned to this investigation of space disposal schemes marks how desperate the radioactive waste problem has become.

Robin Hewitt, a Waste Campaign volunteer, has a degree in mechanical engineering.

Subscribe to *The Sierra Club Waste Paper*, the world's only quarterly on radioactive waste. Exclusive interviews, investigative reporting, citizens' battles and more! We've got the facts, the figures and the inside story for you. Only \$8 for this important resource.

Enclosed is \$8 for a year's subscription to *The Sierra Club Waste Paper*, or \$12 for two years.

I want to stop generating nuclear waste. Here is my contribution to the Campaign.

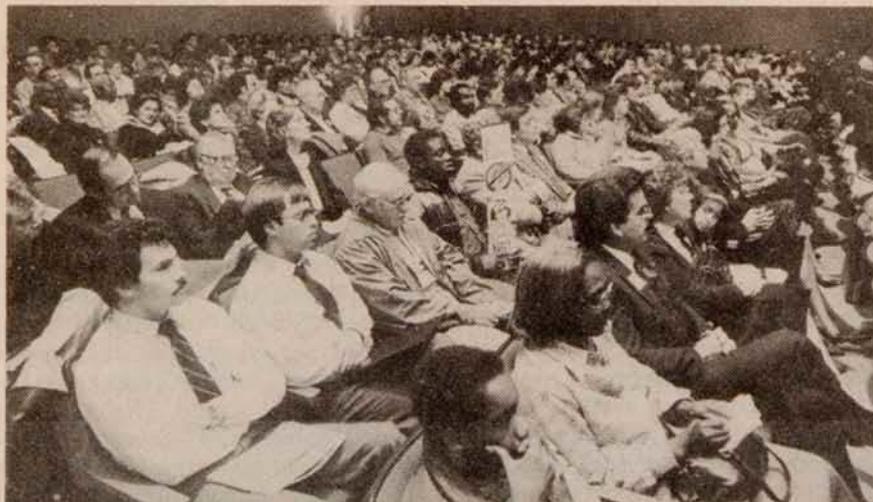
I would like to volunteer for the Campaign. I can help with research, public speaking, writing, visual arts, organizing, or office work. (Please circle your interests.)

Clip and mail to: The Sierra Club Radioactive Waste Campaign, 625 Broadway—2nd Floor, New York, N.Y. 10012.

Name _____ Phone _____

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Victory in North Carolina!



Four thousand citizens stormed a public meeting in Fayetteville, NC January 14, and another 1000 turned out for formal hearings a week later in Bladen County, protesting US Ecology's plans to build an incinerator to burn low-level waste in Duart, NC, 17 miles southeast of Fayetteville. Just four weeks later, the NC Department of Air Quality denied a permit for the incinerator.

North Carolina Incinerator Permit Denied

In a smashing victory for public health and safety, a key part of a license application to operate a radioactive waste incinerator in North Carolina was denied. The notice denying the air quality permit was sent out by the Division of Environmental Management of the Department of Natural Resources and Community Development February 13. The Department of Human Resources which is the North Carolina agency which will grant or deny the license is waiting till the end of the public comment period which expires February 21. It would be almost impossible to operate an incinerator without releasing air, so the license is expected to be denied. US Ecology, operator of radioactive landfills in the

States of Washington and Nevada, was proposing to license the incinerator in Bladen County, North Carolina.

The agency's denial of the air quality permit, announced by Paul Wilms, Chief of the Division of Environmental Management at a meeting of the Environmental Management Commission February 13, was based on several key grounds:

- no prior experience with radioactive incinerators
- the company's poor track record with radioactive landfills, including the \$97 million suit between US Ecology and the State of Illinois, which vitally affects the company's financial stability, and
- technical grounds, including in-

adequate fire protection, problems with carbon-14 and tritium, and no maintenance and replacement schedule.

One ground for denial not mentioned by Mr. Wilms was the tremendous public opposition to the permit, including an unprecedented citizen turnout at two public hearings in January. North Carolina agency officials must still be shaking their heads in disbelief at a 4,000 person turnout in Fayetteville January 16, and 1,000 persons in Bladen County the following week. Highway traffic in Fayetteville was backed up five miles.

The denial vote culminates an almost two year battle between local residents in Bladen County, particularly United Concerned Citizens for Ecology, and the company. On May 23 and 24, one year into the battle, the Sierra Club Radioactive Waste Campaign, Sierra Club North Carolina Chapter, Conservation Council of North Carolina, United Citizens, the Town of St. Pauls and the Robeson County Clergy and Laity Concerned held a crucial public meeting and workshop in St. Pauls that kicked off a revitalized effort against the incinerator. The Campaign provided the technical backup to citizens' concerns. Building and broadening political support, the Bladen County Commissioners were eventually brought around to oppose the incinerator which would release radioactive gases to the air, and possibly toxic dioxin as well. The volume reduction alternative, supercompacting radioactive waste, was the viable alternative recommended by environmental and public interest advocates. Soon statewide political candidates had to take a stand on the issue which moved to the front of the Governor's desk. The victory is a testimonial to what a determined band of united citizens can do, and what United Citizens did. Congratulations North Carolina friends!

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