and concrete chips that cover the floor. More than 90% of the radioactivity is collected in the concrete walls, according to M. D. Pavelek, the Bechtel National engineer whose job is to decontaminate the basement.

Pavelek's two robots report the highest radiation readings come from the concrete block walls that surround a stairway and an elevator. To confirm a direct correlation between the density of the concrete and its radioactivity, Pavelek and his colleagues performed a simple experiment. They took a couple of concrete blocks, stuck them in a wash basin, and poured hot coffee over them. "In a minute, the coffee was in the wash basin," Pavelek reports. "We confirmed something we knew: concrete block is very porous stuff." To reduce the contamination, they have experimented with blasting the concrete block with high-pressure, high-temperature water jets, but unfortunately the wall is permeated with cesium. Pavelek says they might try to flush the concrete block with water from the top or fill the block wall with concrete, hoping the cesium eventually leaches out. A final possibility calls for instructing the robots to destroy the wall. But this would take months and cost as much as $5 million.

Another nagging problem remains. How does GPU Nuclear get rid of 2.1 million gallons of water that was contaminated during the accident and cleanup? The company has proposed three options. They can dilute it and dump it in the Susquehanna River. They can make concrete with it and bury the blocks in an industrial landfill on the island. Or they can slowly evaporate the water and take the residue to a commercial dump. GPU Nuclear says that none of the options would pose any significant environmental hazard. All would meet federal regulations. And all three would involve relatively low-level releases of tritium, cesium-137, and strontium-90. Because the first two options are so politically sensitive, GPU Nuclear is trying to convince the NRC and a vocal community of antinuclear activists to let them evaporate the water. A suit and a number of hearings are pending. Travers estimates that it will take at least a year before the parties agree what GPU Nuclear will do with its water. If the company goes with evaporation, it will take another 2 years and $6 million.

After it is all over, after the defueling and cleanup are complete, after the basement is scrubbed and the contaminated water disposed of, there will still be one lingering legacy from Three Mile Island: the fuel.

For now, this problem has been passed on to the national engineering laboratory outside Idaho Falls, Idaho. Once a naval gunnery range, the laboratory covers 890 square miles of lonely, sagebrush desert. Over the years, the site has supported 52 experimental nuclear reactors, including the first reactor to produce electricity; in this case for the little town of Arco, Idaho. In one corner of INEL is a place called Test Area North, the site of the infamous program to build nuclear-powered jets that was axed by the Kennedy Administration in the early 1960s. A few of the old jet engines are rusting in the desert at Test Area North. It is here that the waste from TMI-2 arrives by railcar, transported in large casks that look like oversized barbells. Officially, DOE maintains that it takes the fuel from GPU Nuclear "for analysis and storage," though there is a lot more storage going on than analysis. Only a minute fraction of the damaged core is actually ever examined.

The rest of it is unloaded from its shipping casks by remote control in the largest known "hot shop" in the world. The fuel canisters loaded in TMI-2 are then stacked together in groups of six and placed very gently in a storage pool. And there the canisters will sit until a national nuclear waste repository is constructed at an as yet undetermined site. "We prepared to hang on to it for 30 years," says Franz of EG&G. "After that, who knows?" ■

WILLIAM BOOTH

Apples, Frogs, and Animal Rights

Apple Computer has withdrawn a controversial television ad after it stirred up criticism from those who saw it as animal rights propaganda.

The ad, which Apple pulled last month, featured a California teenager who became a cause célèbre last spring when she refused to dissect a frog in her sophomore biology class at Victor Valley High School in Victorville. Jenifer Graham, a 16-year-old vegetarian who opposes any use of animals, received a B instead of her usual A. With the support of animal rights groups, she brought suit in Los Angeles federal court claiming the school had acted unconstitutionally in not allowing her an alternative means of learning the material.

Apple Computer, which markets a pathology program called "Operation Frog" was attracted by the extensive local newspaper and television coverage of the story. Jenifer agreed to star in an ad for Apple with the following text:

"Last year in my biology class, I refused to dissect a frog. I didn't want to hurt a living thing. I said I would be happy to do it on an Apple computer. That way, I can learn and the frog lives. But that got me into a lot of trouble, and I got a lower grade. So this year, I'm using my Apple II to study something entirely new—constitutional law."

This message was greeted with great alarm by the California Biomedical Research Association, which represents most of the major research institutions in the state. In late October the association circulated an "action alert" urging people to write in protest to Apple president John Sculley. Executive director Sandra E. Bressler wrote Sculley that the ad was "in very poor taste and offensive" to scientific educators, that it "advances the cause of fanatics," and that Apple was contributing to "dangerous and simple-minded thinking."

Apple, according to its marketing director Bruce Mowery, had no intention of taking a stand on animal research and did not realize the ad would be controversial. Mowery says the company received "a number of letters," both pro and con, and realized "there was confusion as to what the message of the commercial was."

The fuss illustrates how little it takes to stir up this volatile issue. Barbara Orlans, director of the Scientists Center for Animal Welfare and an authority on animal use in the schools, says she was "amazed" that researchers would feel threatened by the ad, which merely illustrates an ongoing trend—"there is quite a lot of getting away from dissection in precollege education." Orlans contends that dissection in the classroom "is not essential or desirable for the emotionally immature" and those not oriented to a career in science.

Practically anything to do with animals in research is inflammatory these days, however. Carol Scheman of the Association of American Universities (AAU) points out that the ad, in effect, was "a cute marketable commercial for antivivisection." The AAU and other organizations are very concerned about the reduction of animal use that is occurring in all levels of education. Frankie Trull of the Foundation for Biomedical Research says that cases have even arisen where medical and veterinary students have refused to do experimental surgery on animals.

If California is any indication, antivivisectionist sentiment is still on the rise. The state legislature will soon be voting on a measure introduced last year that would give all students in public and private schools, colleges, and universities the right to refuse to dissect or harm an animal as part of a course of instruction. ■ CONSTANCE HOLDEN