

Acid to Ashes



ALL PHOTOS BY BEN GUTMAN

What happens to our hazardous waste?

by Ben Gutman

THE POUR ROOM in UC Berkeley's Hazardous Waste Facility looks, at first, as one might expect—mostly gallon containers and bottles with formidable stickers. But on closer inspection, you find some interesting details. The ceiling is very high, the doors have been reinforced, and there are no recognizable light switches or electrical outlets. The room has been designed to the smallest detail for its purpose, and in that way is much like the whole waste-handling operation. Seemingly ridiculous precautions abound, which give rise to a Byzantine set of regulations that govern the waste from its creation in a UC Berkeley lab to its annihilation, typically in a Utah incinerator. The system is, however, the result of experience and careful consideration.

Life in the pour house

WHEN the hazardous waste facility opened less than six years ago, it replaced UC Berkeley's previous chemical facility, a warehouse by the Strawberry Canyon swimming pools known as the "acid house". A plan to replace the acid house with a building near the same site met with considerable resistance from the city and from neighborhood residents, so the new facility ended up on campus, nestled inconspicuously behind the Recreational Sports Facility and baseball field. Within the facility's pour room, small volumes of compatible solvents are combined to fill 55-gallon drums for shipping; high ceilings and reinforced doors would contain any explosion. An explosion is unlikely, though: the solvent wastes are labeled and their components known. As chemicals are combined, pH and temperature are carefully monitored for unexpected reactions. A glass wall encloses a walk-in fume hood where the solvents are poured, so that fumes do not accumulate, and special outlets and switches prevent incendiary sparks.

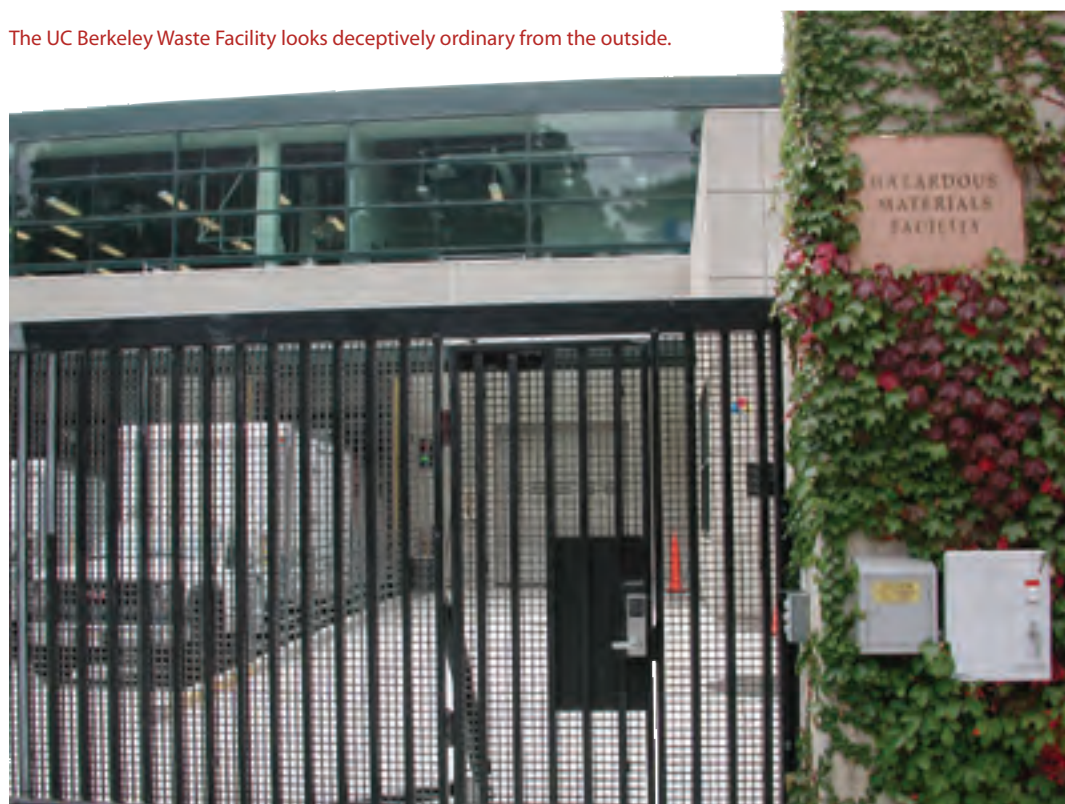
In all, the new hazmat facility is "the best I've ever seen," according to Pat Goff, the Environmental Health and Safety (EH&S) employee in charge of all this waste. The

facility was designed from the ground up with waste handling in mind. Drums of waste never sit outside, since loading bays bring trailers right into the building. Gutters surround the specially-coated floor in 55-gallon units, enough to contain a spilled drum. If more than 55 gallons were to spill—for instance, if the fire sprinklers were activated—the gutters would drain into a 15,000-gallon underground tank. At each stage of handling, separate shelves, bins, and rooms keep wastes categorized by hazard: corrosive, inflammable, toxic, etc. The upper floor is dedicated to radioactive wastes, which have their own distinct set of protocols. And, of course, the building is designed to the most stringent of seismic specifications.

From "cradle to grave"

ACCORDING to the EPA-administered Resource Conservation and Recovery Act, UC Berkeley remains accountable for its waste from "cradle to grave." The moment waste is generated in any one of the myriad labs scattered throughout campus, it becomes the university's responsibility, and remains so forever. The university must safely collect, treat, package, and ship the waste,

The UC Berkeley Waste Facility looks deceptively ordinary from the outside.



and track its handling at other facilities. Finally, if the waste is not destroyed, the university must continue to keep track of its waste as it sits in a landfill.

Luckily, campus researchers do not have to think too much about the waste disposal process. They simply collect waste into bottles as it is generated, and fill out an online materials packing list to request a pick-up. On receiving a packing list, a central computer assigns each bottle, bag, and canister of unwanted chemicals a specific tracking number. This computer is the “hub that allows for cradle-to-grave tracking,” explains Goff. Unlike many similar institutions, UC Berkeley has specialists assess the shipping restrictions on each item before passing the list on to the pickup crew. This responsibility once fell to the lab where the waste was generated. However, in 1994 UC Berkeley was found to be in violation of several EPA regulations: failure to label, improper packaging, and insufficient testing. As part of a negotiated settlement, the university shifted the burden to professionals, reducing the training required of faculty and students. As Geoff Fiedler, inspector for the City of Berkeley, says, “training of researchers is a perpetual weak link in handling toxic waste.”

A microtruck (a sort of industrial golf-cart) carries the pickup crew around the campus to labs that have submitted packing lists. The truck “allows access between the bike poles,” waste technician Phil Kruse says, which is important since the crew must keep to the campus paths. The hazardous waste is not yet packaged to Department of Transportation requirements, and so is not allowed on city streets. The crew follows web-linked PDA’s telling the location and contents of each package. They don’t make it to every building every day, but work to ensure that wastes are picked up within 5 days of submission. If, however, Goff’s staff is reduced due to budget cuts, waste handling could slow down significantly.

Before loading the waste into the microtruck, the reviewing specialists relabel it with a sticker that includes

Chemicals in the waste facility waiting to be shipped (right).
A view from inside the pour room (below).



the specific type of hazard it poses, such as corrosive, inflammable, or toxic. They then return to the waste facility, where the clock starts: chemicals can not remain for more than 90 days. Though some corrosive (acid or base) waste can be neutralized and then disposed of locally, most chemical waste is simply packaged up, labeled, and loaded onto trucks. Dry waste, like contaminated paper towels or pipette tips, is compacted into barrels. Liquid waste must be mixed with compatible chemicals; hopefully, enough compatible waste will arrive to fill a drum. Some waste bottles, however, contain chemicals that are too dangerous to mix. These will be packaged in their original bottles; about 15 bottles can be packed together to form a “labpack.” Once all waste has been packaged, each drum is labeled with its specific contents and hazard type, the waste’s birthdate, “UC Berkeley” (which will always remain responsible for it), and the words “hazardous

waste.” Finally, the waste is ready for shipment. Much of the chemical waste, including almost all of the labpacks, is loaded onto tractor-trailers and driven 660 miles east on I-80 to a facility near the ghost-town of Aragonite, Utah, where the county has designated 100 square miles of desert for “hazardous waste management.”

What would you do with one thousand gallons of sulfuric acid?

The labpacks are incinerated, barrel and all, in a rotary kiln incinerator. This incineration has generated some opposition and concern about environmental safety, which is why Clean Harbors, the company that operates the site, makes such a point of its isolation. UC Berkeley uses a variety of contractors for disposing of other types of waste, some of which are trucked as far as Florida. In the case of particularly toxic dioxins, which fortunately are relatively rare, there is no EPA approved facility in the US and they must be sent to Canada. Though waste shipment and disposal are handled largely by outside contractors and private companies, UC Berkeley remains

ultimately liable for its waste, even after the waste leaves campus grounds, and must continue to document its status for the EPA. Therefore, the university must oversee and audit all contractors and disposal sites to ensure that waste remains safe even in its “grave.”

Overall Berkeley runs a tight waste ship, and procedures and facilities have improved much since the old acid house days. “When I first started it was much worse,” recalls Kruse. “The older professors used to pour everything down the drain.” Over time, they learned how to properly handle and sort waste, and broke out of old habits. And in the last 5 years, UC Berkeley has actually reduced the amount of waste processed, thanks to more conscientious waste handling. As the program continues to modernize and streamline there is hope, barring further budget cuts, that progress will march on.

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