Unearthing toxic wastes: new ways to deal safely with a buried problem

by Jeff Cohen
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When people dumped chemicals in the ground 50 years ago, they thought the problem would go away. It hasn't.

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An estimated 8,000 new chemicals are introduced in the United States each year. Those known to have toxic effects on humans are facing ever-stricter controls on their disposal, but chemicals dumped in the ground unwittingly or illegally in the past — and covered over — are potential toxic timebombs awaiting discovery.

And what can set off a potentially dangerous situation is an earthmoving operation, like a highway project, that uncovers unknown dumping. Accelerating its highway construction program, and facing a growing prospect of striking another chemical cache like the one found along the Century Freeway route, Caltrans has adopted formal procedures to handle such discoveries safely and in compliance with all governmental regulations.

Any suspicious discovery means an immediate halt to work in the area to prevent the exposure of highway workers and the public to hazardous wastes. This is the most important objective of the new Caltrans effort to investigate all finds of suspected toxic wastes. District, headquarters, and private technical personnel will check out and defuse such situations. Caltrans already has a long-standing procedure for handling spills of chemicals and other items on the highways themselves, but lacked plans for disarming a waste dump.

By following the new procedures put in effect last summer, harmful substances can be disposed of properly without jeopardizing employees or the public, according to Richard Howell, designated as the department's hazardous waste advisor.

Howell, working out of the Transportation Laboratory in Sacramento with a staff of three assistants, is establishing and training a network of hazardous waste coordinators in the department's 11 districts. The coordinators will pay prompt attention to any suspicious finding.

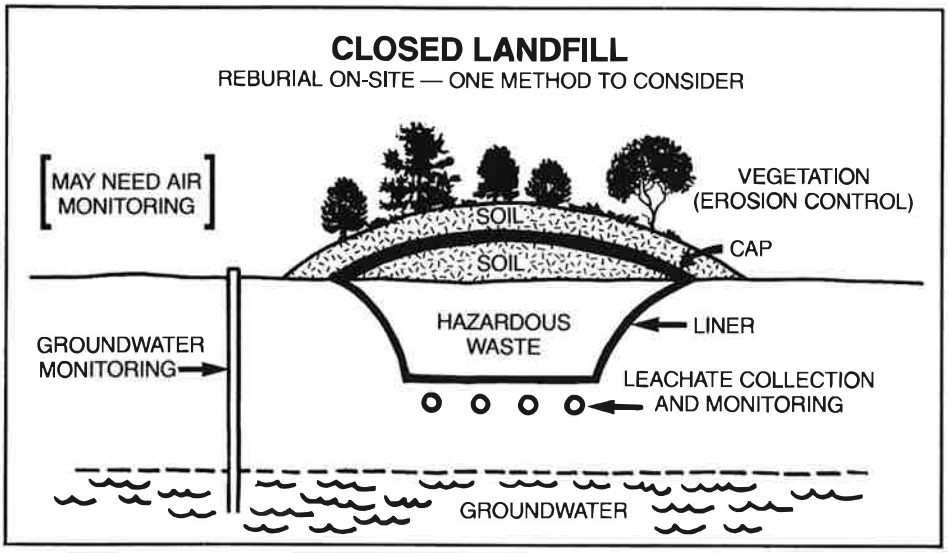
Before the policy went into effect, Caltrans had no specific instructions for its field personnel, which could create confusion about what course of action to take. Today, a strange-looking pipe poking up through a marshy landfill, or an unmarked rusty barrel unearthed in an excavation, will set off a chain of events that can prevent disaster.

Here is the scenario if a Caltrans' or contractor's employee finds something unusual, like oily materials, or notices a strange odor:

First precaution, says Howell, is not to touch anything and contact the resident engineer on the job. Work will be stopped, workers removed from the site, and the area cordoned off, according to the plan. The extent of work-site closure will depend on various conditions, including the presence of gases or uncontained spills. To avert danger beforehand, the districts are using computerized lists of known or suspected dump sites in the state and rechecking right-of-way maps, but special precautions are built into the plan because of the existence of many unknown locations.

After appropriate personnel at the district and headquarters are contacted, a field investigation is begun. Any actual sampling is done by a toxic waste consulting firm which has the specialized equipment, people, and license to handle such tasks.

"To err on the side of caution," as Howell puts it, a scan of the area will be made by the consultant for a range of pollutants, including PCBs, pesticides, and toxic metals. Boring in a grid pattern is one way of determining the extent of contamination. Additional sampling will determine the extent of any groundwater or surface water pollution. Howell's staff includes specialists in biochemistry, hydrogeol-



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ogy, and environmental sciences, who will work with the districts and hazardous waste consultants.

Once the limits of a hazardous waste are determined, several actions can be taken in addition to relocating the project: dispose of the waste off site, treat it, or safely store it on site. Such a decision will be reached in concert with state health and water quality officials.

Disposal presents several problems: high cost and the availability of another location to accept the waste. Precautions taken in moving the substances and storing them to avoid dangerous chemical reactions can push up disposal costs to $150 a cubic yard. There are only seven sites in the state where the most harmful chemicals can be disposed and space is getting scarce. A 1986 ban on heavy metal disposal at landfills will make matters more difficult, but this may prompt more alternative technologies for chemical and biological treatment of waste.

Such treatment may include "mining" of metal-bearing earth at the job site to separate the metals from the soil and allow the return of nonhazardous soil to the site.

Another way to remove harmful materials and recover soil is through aerobic land farming, a chemical process by which oily matter can be broken down by tiny organisms in the soil. This method is already being used by oil companies to clean up their waste residue. Incineration, too, may be appropriate at times.

In some cases, it may be environmentally acceptable to leave materials on the site, buried in a secure non-leaching material and capped with clay, which is impervious to water.

How much of a problem is hazardous waste posing for the Caltrans construction program?

There are 20,000 waste site locations suspected around the state, the possibility of striking one rises with increased construction activity. In the first few months under the new hazardous waste procedures, Caltrans investigated 14 sites, several of which contained hazardous materials.

Once wastes are found on Caltrans right-of-way, the department is considered a "waste generator" under the law and is held responsible for disposal or treatment of the waste and keeping proper records. Department employees could face criminal prosecution for failing to abide by regulations.

"The law extends to all employees who are in control of a job," Howell says, "and it's my job to make sure our employees know what to do."

The Hazardous Waste staff is currently developing a training program with Project Development and Construction, and compiling a four-volume manual dealing with laws, regulations, site investigations, safety, and contingency plans. District and headquarters employees at the associate, senior, and supervisory levels in Project Development, Construction, and Environmental analysis will be given a basic orientation to the program, while the 11 district coordinators will receive more specialized training. Howell and his crew are also being trained in hazardous materials management in a nationally recognized program at UC Davis.

The Willco Dump in the southern California community of Lynwood offers a textbook study of the change in the handling of dump sites. Owned by an operator named Jack Willard (hence "Willco"), the 14-acre dump accepted all kinds of neighborhood refuse until the mid-1950's.

The refuse, the jetsam of an urban community, included the leavings of a battery restoration plant, paint cans, pesticides, and oil drums. Only in the 1970's did these materials become identified by the general population as toxic waste.

Caltrans acquired the Willco Dump in January 1974 as right-of-way for the Century Freeway. The dump was allowed to operate as a refuse transfer station until 1979 when a court injunction against further Century construction was lifted. Caltrans perpared to begin removing the materials.

Because Caltrans was sensitive to widespread concern about the handling of solid waste, CalScience Research Inc. was hired to determine the composition of the materials. (Some years prior, in 1968, Caltrans had done some borings to determine the amount of toxic material at the site, but they were not for purposes of chemical analysis.)

Caltrans requested permits from the local air quality management district and the California Solid Waste Management Board to begin the removal opera-

tion. After the work got underway, CalScience found that the material at the western end of the site was rubble and could be moved to a nearby dump site. However, what had been thought of as fairly harmless stuff in the eastern two-thirds of the site was classified as Class 1 Toxic Waste (the most dangerous), which would have to be transported, under strict supervision, to the BKK dump site in West Covina, some distance away.

Because of the 200,000 cubic yards of toxic waste to be hauled away, costs started to climb. What was originally estimated as a single $7 million project would eventually grow to more than $17 million under two contracts.

At the same time, a considerable amount of controversy was generated over the possibility of compacting the material and building the freeway over it. This alternative received favorable consideration from public environmental and health agencies, but was abandoned because of adverse public reaction.

Finally, all work was halted on the project and Caltrans went back to square one, hiring Geo/Resources consultants of San Francisco to do a further analysis of the remaining material and develop an excavation plan for safe removal of the refuse.

Geo/Resources tested nine wells, took 70 soil samples, and bored 19 holes — a total of 428 feet of drilling — and confirmed Caltrans' earlier description of the materials. Removal work is expected to resume early in 1985.

In the case of the Willco Dump, Caltrans has faced a new era of heightened public concern and knowledge about toxic materials. What we have learned has been invaluable, if sometimes painful, and it has been applied statewide to our new procedures for handling toxic materials.

We have learned to do early and more extensive testing by independent environmental scientists to determine the character of materials. We will have a detailed plan for disposition of the materials that will be checked and rechecked by regulatory agencies before work gets underway.

Time has shown that our handling of the Willco situation has been effective in terms of removing the wastes. But, we know we must be more sensitive to public concern. The new procedures we have adopted assure this in the future.

Federal design awards

This year the first 13 awards for Federal design excellence were presented in this country's history. The awards, made by the National Endowment for the Arts, reflect the purpose of ensuring that government purchase/create design that is cost-effective, well-planned, and reflect a standard of excellence.

Two of the award-winning designs are pictured on the right. The upper photo is of the Linn Cove Viaduct, part of the Blue Ridge Parkway in Asheville, North Carolina. The design of the roadway overcomes the rugged, beautiful terrain without going against the environment. This is a joint National Park Service and Federal Highway Administration project.

The lower photo shows the Intercity Bridge connecting Pasco and Kennewick, Washington. This is a FHWA project. Being the first of its kind, the design has become the model of steel cable-stayed bridges across the world.