PCBs: safe disposal challenges all

First in a series

by Lyn Ann Sloan

NORTHERN OHIO—PCBs, or polychlorinated biphenyls, are a type of organochloride with one general virtue: they're highly heat-resistant. In appearance, they're an oily, colorless liquid, and that non-flammable liquid, when it was invented seemed the perfect substance for applications like insulation of electrical capacitors and transformers.

Unfortunately, that virtue of PCBs is also what makes them so hazardous to our environment. They're persistently non-degradable and non-biodegradable in the environment, and in addition they're fat-soluble.

In other words, once PCBs enter the environment, they stay there, entering the food chain and passing into and accumulating in the fatty tissues of animals and eventually of man. It's been estimated that half the American population has at least three parts per million (ppm) of PCBs in their body.

And there's almost no question now concerning PCBs' toxicity to humans and animals. They're believed to be both carcinogens and mutagens, causing skin disorders, tumors, and birth defects. These harmful effects can result from extremely low concentrations of the chemical, the U.S. EPA has said. If low is 50 ppm, how close to "extremely" low is three ppm? You might ask.

Although the Toxic Substances Control Act (TSCA) of 1976 halted U.S. production of PCBs as of 1979, use of the chemical in closed systems (those sealed off from interaction with the environment, such as capacitors) was permitted, and other uses which were limited or banned by TSCA regulations were given extensions of use for varying periods of time.

TSCA regulates PCB-contaminated wastes according to the level of contamination:

- Below 50 ppm, the wastes are unregulated and can be disposed of in any state-approved landfill.
- Low-level wastes containing between 50 ppm and 500 ppm may be placed in a federally approved chemical landfill.
- High-level wastes are those containing more than 500 ppm of PCBs; the only EPA-approved method for disposal of them wastes is incineration.

This classification system seems deceptively straightforward, but many factors act to complicate it. For example, there are only eight chemical landfills nationwide approved by the EPA for disposal of low-level PCB wastes. Four of these eight are approved only for solid wastes—not liquid.

Solid wastes would include large and small capacitors, transformers that have been drained of their PCB-contaminated oil, contaminated soil and debris of the type that results from explosion of the pole-mounted PCB capacitors used by electric utilities, and dredged sludges.

Liquid wastes can go only to the remaining four chemical landfills, one of which, SECOS, is located in southern Ohio. Or they can be sent to one of a few boilers that are permitted to dispose of low-level liquid PCB wastes. But in any case, use of a landfill entails transportation of the hazardous substances, often for long distances. The threat of an accident—a truck overturning—is always there.

What if your company has high-level PCB wastes to dispose of? Your only option is incineration, at high temperatures (2200°F) and for a specified length of time (two seconds or longer). That's an effective method of disposal which has been shown to actually destroy well over 99 per cent of the PCBs present. But the incinerator you use must be licensed by the U.S. EPA, and at present there are no approved incinerators in the United States. Two incinerators, in Arkansas and Texas, are currently being considered for approval, but even if and when that approval comes through the danger of trucking wastes to these sites remains.

For the present, then, high-level contaminated wastes must be stored. Regulations require that the storage facility be located above the 100-year flood plain, and that it have impervious cement flooring with no drains or seams, six-inch-high curbing on all sides to contain any spill, with no emptied area for the spill cleanup wash of which, as well as the building's exterior, must be labeled with a PCB warning label. If your facility can meet these requirements, your high-level PCB disposal problems are solved . . . or are they?

As of January 1, 1993, any PCB article or container previously stored must be destroyed within one year, by January 1, 1994. Any PCB article or container stored after January 1, 1993, must be disposed of within one year from the date of storage.

These regulations only serve to emphasize an indisputable fact: storage of hazardous wastes doesn't provide a solution to the problem, it merely postpones finding one.

Recently, several potential answers have been discovered, with the development of various techniques for destruction of PCBs. Some are variations on the incineration method, while oth-

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For more information on PCBs, contact:

Goodyear Tire & Rubber—P. F. "Dee" Pingree, public relations manager, Research & Development Division, Akron 44316, tel. 796-2170

Great Lakes Basin Commission—Lee Botts, chairman, 3475 Plymouth Rd., P.O. Box 999, Ann Arbor, Michigan 48105, tel. (313) 665-9300

Ohio Environmental Protection Agency—2110 E. Aurora, Twinsburg 44087, tel. 425-9171

U.S. Environmental Protection Agency, Eastern District Office—25089 Center Ridge Rd., Westlake 44145, tel. 835-5200

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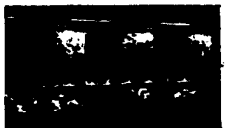

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Great Lakes Basin Commission on PCBs

Lee Bolla,
GLBC chairman:

"Incineration of PCBs in a solution that's very much accepted by experts. And we don't necessarily have to build very elaborate new facilities to provide incinera-tion. Our region has a lot of cement kilns that could easily be adapted to incineration of PCBs.



Lee Bolla

"Communication need to participate in consulting boards that are proposed to be carried out within the community. Suspicion is understandable, but it's simply not possible to continue taking the attitude that we can never allow proper managing or destruction of toxic waste anywhere.

"It's not necessary for every community to provide facilities for disposal of every sort of toxic waste, but any community that wants to attract industry had better make sure that it has a way of disposing of hazardous waste. In today's situation, that's something a company is going to want to know about.

We're advocating a regional system of hazardous waste management, whereby states and communities could cooperate in working out the means and location of disposal. The Basin Commission currently has a contract with the U.S. Dept. of Commerce and the Economic Development Administration to analyze our region's needs for hazardous waste management in order to protect industry and jobs. We're focusing on three industries: steel, electroplating and paint manufacturing. For the Great Lakes region in particular, proper disposal of hazardous wastes is critical to our economy as well as our environment. We have more at stake than any other region of the country.

"What's needed is for people to begin to think of hazardous waste management and disposal as a municipal service, part of the infrastructure of our society, just like water service or garbage disposal. But the political facts are that right now people are so fearful that they organize to prevent the handling of toxic wastes. They're trying to put off the inevitable.

"I'm convinced that industry is prepared to deal with the problem, but they're in a difficult position because they're faced with public blame for having created the problem in the first place. That's a very limited viewpoint. In our society has benefited from the products that have come out of the use of these hazardous chemicals."

PCB Point of View

Dr. Paul Dellman
Northeast Ohio Areawide Coordinating Agency:

"In dealing with hazardous waste problems, the weak point is the lack of adequate disposal sites in regions where the waste is being produced, and public opposition to establishing these sites.

"Ultimately, there have to be disposal sites. It's like nuclear waste: you've got to put it somewhere. You can't tell a manufacturer he has to abide by a whole set of regulations and have him say, 'But I have nowhere to dump it.'

"We at NOACA have this theoretical in trying to get involved in this problem of PCBs. Psychologically, it's like bookkeeping—everyone's nervous and gunshy and it's extremely difficult to find out what's going on . . .

"We haven't documented the overall hazardous waste situation in this area yet, because there aren't any figures. Once the U.S. and Ohio EPA are able to build up some steam, then NOACA can tap that information. But at this point it's almost impossible to get a handle on who's producing the waste here, who's handling it, and how it's being handled."

PCB Point of View

William King
spokesman for Cleveland Illuminating Co.:

"We have about 10,000 pole-mounted capacitors in use now that contain PCBs. About 100 of them burst each year. When that happens, we have special crews that go out to remove the capacitor and any contaminated material, including dirt, grass, sponges, brooms, even the plastic aprons worn by the crew. All of that material is sealed in drums and taken to our Miller Service Center in Cleveland, where it's held temporarily until there's a large enough amount (about six months' accumulation) to send to the certified landfill in Niagara Falls.

"Would we like to destroy rather than store our PCBs? You bet we would. But we haven't been made privy to those techniques yet.

"Most of our capacitors aren't situated in areas where they could harm people if they did explode, and we keep watching them for any signs-of impending rupture. To replace those capacitors all at once would cost more than don't contain PCBs would be both costly and time-consuming.

"PCBs do indeed present a problem, but only in terms of disposal. They're only toxic if ingested, but the chances of that in our case, we feel, are very small."

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PCB Point of View

Dana Parker
research scientist
Goodyear Tire & Rubber:

"When PCBs are incinerated, there's no danger as long as everything works perfectly. But if it doesn't, then those PCBs are out the stack and flying downwind.

"With a chemical process, you test it and monitor it. If a batch of material isn't completely PCB-free, it's still in an enclosed system so you can run it through again until it's clean . . .

"More methods need to be developed to destroy PCBs. Incineration is a solution, not the solution. I don't know why incineration was initially assumed to be the best means of PCB disposal. The U.S. government has thousands of chemists. They could have done what I did to develop a chemical process, by going back through the technical literature on the subject.

"But in the meantime, store the PCBs properly. That's a good stopgap method.

"The PCB situation isn't a crisis. In a sense, any problem like this represents an opportunity. At Goodyear, we saved at least half a million dollars by using our process. If you were to do that through the whole country . . .



Dana Parker, Goodyear research scientist who invented and owns patents on chemical process for destruction of PCBs, displays a model of a PCB molecule.

There's a profit to be made in cleaning up the problem, and in our free enterprise system, it will be done. Government regulation only stifles that initiative."

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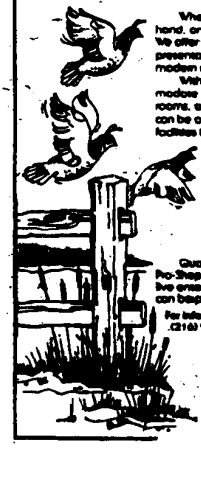

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Gestalt Institute helps business

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That high-powered young individual may realize being forced to fit into a company's mold, and gestalt sees that kind of resistance as an essentially positive force. "It's not something to be automatically gotten rid of," Carter says, "without having an appreciation of the problem it causes." That's why gestalt chooses to shelter to conflict. "Take the ongoing conflict between research and development, and marketing — that conflict, although it should be monitored, is healthy as long as it's not carried to extremes."

Intervention, Carter explains, is any action taken to effect a situation. "Even the decision to do nothing is an intervention about a situation in an intervention, because temporarily at least it brings that issue suppressed in people's minds. So intervention has a much wider meaning than just the action that's finally taken to remedy a problem."

As an example of gestalt techniques in action, Carter describes a company with several different supermarkets, all with different work cycles. "When one was busy, they'd borrow employees from one of the others. But what happened was that the loaner department would send over its worst employees. And the borrower department would give them the worst work. The result, of course, was a terrible person. And the company members were to discover, 'Who did that terrible work?' Then they'd lampoon the employees. But from a gestalt point of view, the appropriate reaction would be to change the interaction between departments: if one department is going to send bad employees, they should be given the control work. The intervention we used to carry out that change was simple yet effective — the department with the subsequent responsibility for the work was made responsible for its quality."

Carter stresses that the Gestalt Institute "doesn't use techniques as a cure-all. Most problems today aren't simple problems, and they can't be cured by imposing a single technique, like, say, management by objectives, in every set of circumstances. A lot of people walk around with one model of how decisions should be made, but what works for one may be totally inappropriate for another."

That philosophy also underlies the training programs that GSC offers. "Our aim isn't to train people to be generalists. We're interested in gestalt as a separate component of learning at all phases. We want people to understand their own structures and processes so as to use them most effectively and make the most effective changes in order to remove obstacles in reaching goals. We want them to have a good basis of skill, knowledge, and use of self at every level — individual, group, and organization — because actions take effect on multiple levels. When I work with an organization on a consultant basis, for example, I have to constantly ask myself: 'How will this affect the organization? How will it affect the individual?'"

The Gestalt Institute's training program in Organization and System Development runs for 18 months. A nine-day initial session is followed by a series of five- or six-day sessions scheduled every two months. The program includes about 20 to 25 people from business, social, and health fields, including managers, representatives from training departments, those who work in organizational development programs. (The deputy auditor general of the Canadian government is an alumnus of the program.)

The Gestalt Institute is hosting a major international conference, the first of its kind, on April 9-12, entitled "Complex Systems: The Application of Gestalt Theory to Working in Organizations."

PCB Point of View

Melinda Becker
Ohio EPA:

"Warehouses are filling up at a high cost to industry, waiting for the U.S. EPA to license an incinerator for high-level liquid PCBs.

"Here at Ohio EPA, we know very little of the details of the PCB situation in Ohio, because that all comes under U.S. EPA regulations. We have an interest over TSCA. And so far, we have no active program underway to build up such information."

Fauver is sr. vp

PAINESVILLE—The board of directors of Lake National Bank has elected Keith L. Fauver a senior vice president. Fauver, who heads the Commercial Banking Division, has had varied management experience since joining Lake National in 1985. He had risen to vice president in the Commercial Banking Division by 1990, when he was assigned broader responsibilities in commercial banking.

PCB disposal a challenge

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are no new chemical or even biochemical discoveries.

To destroy PCBs by incineration, for example, it's not necessary to construct expensive new incineration facilities. The Great Lakes Basin Commission points out that existing rotary cement kilns are perfectly equipped for such high-temperature combustion. A danger inherent in incineration of the chemical, however, lies in inadequate or faulty controls which could permit incompletely destroyed PCBs to escape out the smokestack and into the atmosphere. (That has been one of the major sources of contamination of the Great Lakes by PCBs.)

Another possibility for successful destruction of PCBs lies in the chemical breakdown of the PCB molecules. Several methods are currently being developed. The best-known of these was discovered by a research scientist, Dana Parker, at Goodyear Tire & Rubber in Akron. That method centers on of adding a sodium compound to the PCB-contaminated wastes; the sodium combines with the chlorine in the PCB molecule to yield sodium chloride (table salt) and an innocuous organic waste. Goodyear applied the process to contaminated heat transfer oils, and was able to recover the oil, minus the PCBs. A limitation of the method is that at present it can't be used on waste-based wastes (which would create an explosive mixture), and it may not prove practicable for large quantities of wastes, or for very high-level concentrations of PCBs.

Goodyear says it created the process "for selfish reasons, because we had a PCB problem and we wanted to take care of it on our own property, with our own equipment." The company would like to see other firms adopt the process on an in-plant basis, for example, it's not necessary to construct expensive new incineration facilities. The Great Lakes Basin Commission points out that existing rotary cement kilns are perfectly equipped for such high-temperature combustion. A danger inherent in incineration of the chemical, however, lies in inadequate or faulty controls which could permit incompletely destroyed PCBs to escape out the smokestack and into the atmosphere. (That has been one of the major sources of contamination of the Great Lakes by PCBs.)

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PCB Point of View

Marion Young
environmental protection specialist and field investigator, U.S. EPA Region 5:

"It's not that the EPA doesn't want to license incinerators for PCB disposal. The problem is largely a matter of community opposition — nobody wants such a facility nearby. . . .

"TSCA regulations require that any facility storing PCB wastes must keep a detailed annual record of those wastes — quantities, destination, weight, and so on. In Region 5, which includes six states, we've done about 170 PCB inspections since 1978. Some have led to litigation, or enforcement procedures, but it appears that most often the record-keeping has been adequate. Most large facilities seem to have added an up-to-date process to keep track of disposal of regulated wastes. Others had problems prior to the regulations, and are still having problems. But as getting them, problems showed up."

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