The Sun

Sunday, March 22, 1981

PCB— deadly and pervasive

sunday special

First of two parts
By JEANNINE GUTTMAN
Sun Staff Writer

Fifty-two years ago it was hailed as "the wonder chemical" of the decade and was credited with protecting many a home, school, hospital and business from electrical fires.

Today, however, the compound has become one of the most notorious toxins in the country. Scientists have debated that distinction. Some maintain it causes cancer while others say it's no more dangerous than table salt.

The chemical is PCB, an acronym for 209 compounds known as polychlorinated biphenyls, which were invented to be used as electrical cooling oils.

Today PCB can be found in everything from microwave ovens to television sets, fluorescent light fixtures, electrical transformers and capacitors, refrigerators and air conditioners. Before 1979, PCB was also used in carbonless copy paper, printing ink, varnishes, paints, a number of pigments and dyes, textiles, sealants, fire retardants, natural gas pipeline compressors and plasticizers, which are softeners used in adhesives and adhesive tapes.

Although new studies have cast doubt on the widespread belief that PCB causes cancer in humans, there is reason to be concerned about the chemical because it "bioaccumulates" in nature.

That means that PCB, which is a close chemical cousin to DDT, does not metabolize and cannot be broken down by plants or animals. Rather, it moves up the food chain and accumulates along the way. The danger is that PCB could end up on your dinner plate in a high concentration in fish, meat, eggs or poultry.

And once you've ingested PCB, it remains unmetabolized in your body and lodges itself in your fatty tissues. The toxin has a half-life of 20 years. In other words, in 20 years' time about half the PCBs you ingest today will still be in your body, along with what you ingested yesterday and so on.

Scientists and researchers are concerned because no one knows exactly what PCB does once it enters the body. Nor is anyone certain how much of the toxin the body can safely absorb over time.

Not surprising, almost all Ameri-

PCB-ARCH-EXT0371308

PCB —

a 'wonder chemical' that got out of hand . . .

(Continued from A-1)

cans have traces of PCB in their bodies, according to a U.S. surgeon general's report on hazardous waste issued in September 1980. The chemical was cited as one of a number of toxic compounds so pervasive in the environment that there's no way to escape it.

The chemical *does* seem to be everywhere. In 1979 it was found in the breastmilk of a Lafayette, Colo., farm woman. That same year it was also found in a herd of Kansas cattle, in Maine lobsters and along 200 miles of roadway in North Carolina.

In 1980, a DePaul University scientist who examined the dust in his Chicago apartment found sizable amounts of PCB. And recent government soil samplings found PCB in the snows of Antarctica.

For more than a decade, PCB has been discovered in all kinds of foodstuffs across the country. It has contaminated milk in West Virginia, meatmeal in Illinois, fishmeal in North Carolina and Puerto Rico, fish in the Hudson River and the Great Lakes and poultry feed packaged by Ralston Purina, according to a March 1980 report by the U.S. Food and Drug Administration.

"And those incidents are the ones that are *known*," cautioned Carol Tucker Foreman of the FDA. "It's very likely that there are a number of localized incidents of (PCB) contamination each year that we never know about."

But Monsanto Co. of St. Louis, Mo., which invented the chemical in 1929, has issued scores of press releases and sent their top directors on dozens of speaking tours to denounce what it calls "the PCB hysteria."

Says Dr. John H. Craddock, manager of Monsanto's Product and Environmental Safety Division, "The hazards of PCBs to humans have been greatly exaggerated. PCBs *are not* human cancer-causing agents and they *are not* deadly toxins. PCBs are considered only mildly toxic on an acute basis when ingested by humans — about on the same order as common table salt.

"The public has been unfairly alarmed about PCB and that's because officials in the government completely overreacted and chose PCB as some kind of toxic scapegoat," Craddock told The Sun.

• • • •

What is PCB used for and why is so much of it around — an estimated 750 million pounds?

Since 1929 it has been used as a cooling oil in nearly all things electrical because when it comes to preventing fires, few substances beat PCB.

Even though PCB use was banned in 1979 when Congress approved the Toxic Substances Control Act, the law allows a five-year phase-out "grace period." That means that PCB-filled appliances and equipment will be in use around the country until 1984.

The chemical's properties are so extraordinary that it took many years to find a replacement for it. For that reason, officials with the U.S. Environmental Protection Agency say, it was not outlawed until 1979, even though its toxic dangers were known in the late '60s.

PCB was a laboratory breakthrough because it had so many desirable qualities. The compound is insoluble in water, resistant to biological and chemical destruction and tolerates extremely low temperatures without changing its chemical form or state. It could insulate and cool hot electrical coils while neither conducting current nor igniting and it satisified every government safety code when it came to electrical fire prevention.

Then in 1975 a two-year test study on female rats linked the chemical to liver cancer. Hundreds of articles were written, all labeling the chemical a cancer-causing agent, and fears about PCB spread rapidly.

Later research has indicated PCB may not cause cancer in humans and does not necesarily cause cancer in rats, either.

After that latest batch of studies many industry officials — particularly the Monsanto Co., the sole producer of PCB in the U.S. — breathed a sign of relief.

And as for bioaccumulation, a recent study on fish in the Great Lakes showed that the accumulation of toxic chemicals like PCB and DDT is not passed to the animals' offspring. Monsanto uses that study to show that the environment "can be cleaned up if we stop dumping chemicals into it," said Craddock.

Unfortunately, no one knows what happens to *people* who are either exposed directly to PCB or who eat fish and other foodstuffs containing PCB. And, unless one submits to extensive and complex blood tests, there's no way to determine how much PCB each of us has in our bodies or how much PCB we may be eating at breakfast, lunch and dinner or drinking in our water.

For those reasons, human bioaccumulation of PCL is quite frightening. It is so feared, in fact, that last year a single incident of PCB contamination resulted in the destruction of 325,000 chickens, 4 million eggs, 41,000 pounds of meat and bonemeal, 12,000 cases of frozen strawberry cakes, 184,000 pounds of concentrates and finished feed and 3,375 hogs.

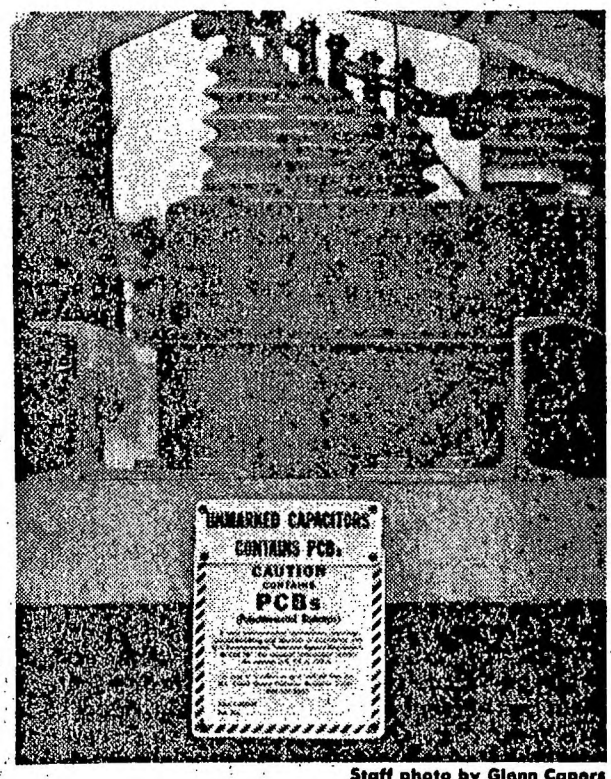
It began when an undetected leaky transformer dripped about 200 gallons of PCB-insulating fluid into feed at the Pierce Packing Co., an animal feed distributor in Billings, Mont.

Working its way up the food chain, the PCB contaminant spread into 19 states and two foreign countries, Japan and Canada, before it was detected. Some 1,400 firms may have received the contaminated meatmeal or feed made from it, the U.S. Food and Drug Administration reported.

It is impossible to say how many persons and livestock ate some PCB-contaminated food prior to detection or whether the government was able to track down every PCB-tainted morsel.

But it is possible to say that every person alive today has varying amounts of the chemical in their bodies. Random studies "have revealed PCBs in

PCB-ARCH-EXT0371309



Staff photo by Glenn Capers

Sign warns that PCBs are used in these Southern California Edison Co. capacitors in Rialto.

human fat tissue and blood plasma in amounts greater than 2 ppm (parts-per-million) and 29 ppb (parts-per-billion), respectively," according to a four-volume report issued last year by the Electric Power Research Institute in Palo Alto.

The EPA has ruled that any electrical cooling oil or lubricant with more than 50 ppm of PCB represents a health hazard. And any material containing more than 500 ppm of PCB must be destroyed by incineration.

To put all those figures in perspective, most electrical transformers and capacitors use PCB concentrations at 500,000 ppm or higher.

In the past 30 years, more than 750 million pounds

sunday special

of PCB were produced. And nearly all are believed to have been discharged into the environment — and the food chain, the FDA states.

Today, approximately 84,000 utility PCB transformers are still in service, containing 180 million pounds of PCB mixtures. About twice as many pounds of PCB are used in capacitors as in transformers and 95 percent of all capacitors contain PCB, the study by the Electric Power Research Institute found.

Under the 1979 Toxic Substances Control Act, utility companies cannot be forced to replace PCB-filled equipment before the natural lifespan of the machinery. In other words, PCB equipment does not have to be replaced until it fails. Ironically, such failures often start with PCB leaking, dripping and/or exploding into the environment.

In addition, since less than 1 percent of PCB equipment fails in the first 40 years of use, many companies and industries may still be using the chemical in the year 2019 — which is 40 years from the date PCB was outlawed by Congress.

"It's a very stable, immobile, persistent chemical. It's very tenacious and virtually nothing will break it down," said a spokesman for the FDA which set "tolerance levels" for PCBs in 1973, four years before the Environmental Protection Agency acted on the problem.

Because PCBs were used in printing ink and food processing equipment, the FDA also set tolerance levels for paper food packaging materials and banned the use of PCB in industries that handled food, feed and food processing.

However, the primary usage of PCB — as cooling oil in electrical transformers and capacitors — was not banned outright "mainly because there were no suitable replacement chemicals," said Dr. Paul Williams of the state Health Department's Hazardouus Materials Management Division in Berkeley.

Monsanto "wanted to stop production of PCB in 1975 but the EPA asked us not to because there was nothing to use in its place," Craddock told The Sun.

"The EPA thought that taking PCB off the market without a suitable replacement chemical would have a catastrophic effect on the nation's utility industry and would cause wide-spread power outages," Craddock said.

• • • •

What progress has been made toward finding a replacement for PCB?

According to nearly all government and industry officials contacted by The Sun, it has been less than satisfactory.

Since 1977 the nation's utilities have been working to come up with an adequate substitute for PCB.

In those years, chemists have come up with two such replacements: silicones, which are made by several manufacturers, but not Monsanto, and a chemical called *dioctyl phthalate*, or DOP, which is being used as a PCB substitute in electrical capacitors.

Some replacement is going on now, even though the EPA ruled that equipment does not have to contain non-PCB fluids until it malfunctions.

"Although the law says they can use them (PCB-filled equipment) for the normal life span of the equipment, public pressure is forcing the utilities to take them out sooner," said Craddock.

One utility that has really felt the pressure is Pacific Gas and Electric Co. in Northern California, where "an immediate replacement program is costing us between $30 million and $50 million," said one company spokesman.

But will those customers be appeased if, as Monsanto's Craddock predicts, "their electric bills double? I don't think so. I think consumers will take a second look at PCB when that happens and it's bound to happen."

Even though PCB is on its way out, the toxin trauma that the nation's electrical industry has gone through is far from over.

In fact, many utility officials fear that it may only have begun.

Their fears are based on test results recently released by the National Cancer Institute. The results show that one of the non-PCB replacement compounds, DOP, has been found to cause cancer in female rats.

Next: The effects of PCB and the problems of destroying it.

PCB-ARCH-EXT0371310

Exact amount of PCBs in county impossible to gauge

By JEANNINE GUTTMAN
Sun Staff Writer

What is the impact of PCB locally?

Following is a breakdown of the major utilities and industries in San Bernardino County that use or have found the presence of polychlorinated biphenyls in their machinery and equipment.

The list, however, is incomplete. The exact amount of PCBs present in this county is impossible to gauge because the chemical has been so widely used.

Despite the 1979 manufacturing ban on polychlorinated biphenyls, the toxic substance is still found to some degree in nearly every home, business and office building.

In fact, PCBs are virtually inescapable since they are present wherever electricity is generated, stored and/or used. This can encompass everything from huge electrical transformers and capacitors to television sets, microwave ovens and fluorescent lights.

Southern California Edison Co.

The county's chief utility uses PCBs in 153 of the electrical capacitors atop telephone poles in the city of San Bernardino. It does not use PCBs in its transformers, said Edison's information officer Joe Falkner. Figures for other cities were unavailable. Edison officials said the number of PCB-capacitors in San Bernardino "is comparable to other cities of its size."

Capacitors ordinarily look like large grey or white suitcases and transformers resemble big grey cans. And their functions are quite different. Capacitors store energy until needed. Transformers take "the raw electricity off the (utility) line and 'transform' it down to a voltage that is usable in your home, usually 110 (volts)," Falkner said.

Both types of equipment generate heat and PCB cooling oils have been used to guard against fires and explosions.

Edison also uses PCBs in a large number of capacitors in 17 power substations in the county's central district, which includes San Bernardino, Grand Terrace, Fontana, Rialto and Bloomington.

Each capacitor averages about three gallons of pure PCB liquid, which contains an average of about 500,000 parts-per-million (ppm) of the banned chemical.

No spills have occurred this year and only one spill was reported last year. That incident took place in Fontana in October and was handled "quickly and efficiently. No one was exposed to the PCB and no health problems were reported," Falkner said.

The spill occurred behind the Stater Bros. Market on San Bernardino Avenue and Sierra Way and was found when "an employee patroling the lines spotted the leak. We went out and cleaned it up, dug out the soil and replaced the capacitor with one containing a non-PCB solution," Falkner said.

Currently, all Edison electrical equipment containing PCB oils is marked with yellow warning tags. New equipment carries blue stickers showing it contains non-PCB fluids.

"We follow very specific guidelines and procedures for handling spills in accordance with the EPA (Environmental Protection Agency)," Falkner said. "The workers wear special protective clothing and full gas masks, gloves and plastic overshoes. The liquid from the spill is removed and placed in steel barrels along with any of the soil that is contaminated and any rags used to wipe it up."

It wasn't always that way, Falkner added.

"Quite honestly, we cleaned up PCB spills rather haphazardly before 1979. No one thought the spills were any more dangerous than an oil spill and that's how we treated them. We cleaned them up and threw all the soiled rags in the trash.

"PCBs have been used a long time — since the 1930s. It's not like it's something that all of a sudden magically appeared."

Falkner added that to his knowledge no Southern California Edison worker has ever had adverse health problems from exposure to PCB.

Southern California Gas Co.

Although Southern California's largest natural gas utility does not directly use PCB, "trace amounts" were recently found in five locations along its 37,000 miles of pipeline.

The PCB was discovered in routine tests made Feb. 25 and two of the five locations are in the North Needles area where the highest concentrations of PCBs were found, said San Bernardino district manager Ray Sharp.

The PCB concentrations were more than 500 ppm, preliminary tests showed, Sharp said. PCB also was found at the company's Hollywood base station, its Beverly Hill's base station and on one of its utility trucks that collects pipeline "drips," as the sediment containing the PCB is called.

"After checking at 27 locations, we found that five areas contained trace amounts of PCBs," Sharp said. "We found the chemical in the drips, which are like traps used in sinks."

Since PCBs are heavier than water, the compound filtered out of the gas as it moved along the pipeline and collected in the drips. "There's no danger of PCB entering anyone's house through their stove or anything like that. The PCB couldn't possibly get that far," Sharp said.

PCB-ARCH-EXT0371311

"To our knowledge we have never used a synthetic lubricant with PCB in it, but some gas companies do use it as a lubricant on valves and fittings. About 90 percent of our natural gas comes in from out of state — from New Mexico and Texas — so we assume that's were the PCB came from."

Sharp said extensive chemical tests are now being done to determine the exact amounts of PCB found.

"To our knowledge, none of our workers has had any of the health problems associated with PCB — no skin rashes, gastrointestinal problems, headaches or respiratory problems."

Kaiser Steel Corp.

The Fontana steel plant uses PCB "in various places in the mill and we are currently in the process of phasing it out," said spokesman Joe Clark. According to the federal EPA, the chemical is routinely used as a cooling oil in mill equipment because of the intense heat involved in making steel.

Clark also said that Kaiser operates two electric substations at the plant and both facilities use PCB in "enclosed systems," which means in its electrical transformers and capacitors.

"I think we're just like everybody else. We've been using them and now we're phasing them out," Clark said.

Hoover Dam

The Department of Energy facility on the Colorado River near Needles uses some PCB liquid in its giant electrical capacitors. Like most other users, the Department of Energy is "working to replace the capacitors as they fail and replace them with non-PCB equipment," an official said.

'Don't touch me ... I may be contaminated'

SAN BERNARDINO — The driller's wife said she doesn't remember much about the day her husband came home barefooted and said, "Don't touch me. I may be contaminated."

After the initial shock, her first reaction "was panic. I said, 'Where are your shoes? Where are your socks?' and he said, 'Oh, they confiscated them at work. I worked with some kind of contaminated material; some kind of chemical and it got on my shoes and they said I couldn't take them home.' "

Her husband, Bob, (not his real name) had gone to a site in the desert to do what he thought was routine soil sampling.

What Bob didn't know was that PCB had accidentally been spilled at the site and officials at the local water agency were afraid it had seeped into the water table. The officials wanted some soil tests run and Bob's company was asked to do them.

The true identities of Bob and his wife, who will be referred to as Amy, have been withheld because they fear recriminations. Bob thinks he may be harassed or fired if he talks to the press about the PCB spill that went bad.

"But I felt it was more dangerous not to talk about it," Amy said in a recent interview. "Because I'm afraid that if we don't get something in the paper about this — something to prove that Bob was actually at the spill — we'll have no way of linking the spill to any cancer Bob may develop in the coming years."

After Bob arrived at the location, he quickly discovered "that the whole thing was a bit weird. Because when I got there, the foreman told us that some PCP or something like that had spilled; that it was cancer-causing; that it can harm the liver and stuff if you breathe it in.

"Then they gave us protect clothing — paper coveralls and a full gas mask and gloves and plastic-type bags to tie around our feet. At that point, I started to get nervous about this PCP or PCB stuff, but I felt I had to do it or get fired."

The protective gear, however, didn't seem to afford much protection for Bob. During the eight-hour drilling job, "one of the bags around my shoe just gradually wore thin from walking on it and it tore apart. I got some of the (PCB) oil on my shoes and that's the reason they confiscated them."

And even though the rest of his protective gear remained intact, Bob was admonished to throw out all the clothing he wore to the spill.

"They told me never to wear any of those clothes again. They told me to throw out everything when I got home," he said. "That's when I started to get scared, really scared. I thought, 'What the hell's going on here? I was wearing protective gear, wasn't I?' "

PCB-ARCH-EXT0371312

When he got home — minus his shoes and socks — "Bob seemed a bit shook up. He started taking off all his clothes, every single stitch, and put them into a plastic trash bag," recalled Amy.

According to Bob, "They told me to put all the clothes I was wearing into a plastic trash bag — they said to make sure it was a heavy-duty type plastic bag — and to tie up the bag good and take it to a garbage dump."

Bob's boss told him he would be reimbursed for the clothing and boots. Within a week, Bob received a new pair of boots and a check to cover the clothing he'd thrown away.

Bob did not go to his doctor for a skin and blood test, like Amy wanted, "because I guess he didn't even want to think about the possibility that he might have been exposed to the PCB," his wife surmised.

After that first day, which Amy said "has become a big blur to me," she spent a week "trying to find out just what this chemical was. Someone at the (state) water resources board told me they thought it caused liver cancer but they weren't sure.

"I called all kinds of different state and county and federal agencies and got a real run-around. It took me all week to get no where. I just wanted to see if this stuff was dangerous or not."

Amy said one official told her PCB could be breathed through the skin's pores and absorbed through the eye tissue while another told her it was basically harmless and that she was overreacting.

The more phone calls she made, the more "these officials would say I was overreacting. I found hardly anyone sympathetic. And the ones who were concerned gave me a phone number to call someone else. They really didn't want to have anything to do with it. No one wanted to get involved.

"I don't know much about cancer and I'm not a chemist," Amy said. "But I know that if you are exposed to a known carcinogen, then 9 times out of 10 you'll get it; you'll develop cancer."

Bob says he feels fine "right now. I feel great today. But what about 10 years from now? Will I be fine then? Or will I be dying of cancer?"

The problem with PCB is that, although it is a known toxin, its full impact on human health is not known. Some scientists think PCB may be linked to cancer but others point to new evidence that suggests the compound may have no long-term effects.

But to anyone who's been exposed to PCB, that academic debate doesn't mean very much.

"It's the *not* knowing that is killing us," Amy said. "It's like this constant worry in the back of your mind. You try to forget and think it's nothing because you don't feel bad. But cancer doesn't make you feel bad at first, does it?"

— By JEANNINE GUTTMAN

PCB-ARCH-EXT0371313

The Sun

city final

Monday, March 23, 1981

A Gannett Newspaper Serving the Inland Empire: San Bernardino, California

Destroying PCB:

A costly assault on the improbable

Second of two articles

By JEANNINE GUTTMAN
Sun Staff Writer

In its chemical state, PCB — polychlorinated biphenyl — is described by the federal Food and Drug Administration as "snow white, purely crystalline, deadly toxic."

In its manufactured state, when PCB is mixed with mineral oil for industrial use, it appears as a white, oily substance with an odd, pungent odor that's hard to describe.

But in either state, PCB is nearly indestructible.

And despite a 1979 production ban, PCBs remain in wide use. They can be found in microwave ovens, fluorescent lights, transformers, capacitors, television sets, refrigerators — in other words, in almost every electrical appliance.

For 52 years, PCB has provided nearly "foolproof" fire protection from electrical blazes and explosions, say officials at Monsanto Co. which invented the chemical in 1929.

When the compound was first marketed, it was touted as "the wonder chemical of the decade" because it was virtually fireproof and, as a coolant oil, could transmit electricity and heat without igniting.

It was also stable, reliable and had a long chemical life expectancy.

Perhaps too long.

Despite years of study, scientists could not figure out how to destroy PCB. It was virtually immune to chemical and environmental breakdown.

Faced with a growing PCB storage problem, the U.S. Environmental Protection Agency finally gave its approval two months ago to the only known method for destroying PCB — incineration at 2,200 degrees Fahrenheit inside sealed, concrete kilns.

But some EPA officials — like John Dickinson, chief of the hazardous waste section in Atlanta, Ga. — believe that PCB incineration has not been studied enough to have been given "the green light."

Today, there are millions of pounds of PCB being stored in 55-gallon drums in secluded landfills across the country. But there are only two incineration sites — one in Texas and the other in Arkansas.

At both facilities, there is a year's waiting list that is growing by the day as hundreds of utility firms, foundries, steel mills and scores of banks, high-rise apartments and universities try to rid themselves of PCB.

Without a doubt, the toxin trauma has been a costly and time-consuming experience for U.S. industry. And the expense incurred from PCB disposal "is bound to be passed on to the consumer," said John H. Craddock of Monsanto Co. in St. Louis, Mo., which was the sole producer of PCB in the U.S.

"No one in this company is going to deny that PCB is toxic," Craddock told The Sun. "What we're saying is that it's not *deadly toxic*. That's ridiculous.

"It requires a certain amount of care in handling it. Just like gasoline does, which is also toxic. Most Americans don't come into direct contact with PCB, anyway. And most Americans probably have more toxic substances right at home, under their kitchen sinks."

The viewpoint of Monsanto is probably best summed up in a 25-page report it released on the

(Continued on A-4, column 1)

PCB-ARCH-EXT0371314

Destroying PCB: A costly assault on the improbable. . .

(Continued from A-1)

uses, health and environmental effects and disposal of PCB.

"PCBs," the preface states, "are a classic case history of a true risk/benefit dilemma."

PCBs do pose a dilemma because no other chemical offers as many safeguards and benefits when it comes to electrical fire prevention. In fact, nothing usable as a cooling oil has been found to be as fire resistant as PCB.

As Craddock maintains, PCB "has saved thousands of lives by preventing fires in high-rise buildings, hospitals, schools, underground utility tunnels, underground transportation facilities like subways, trains, river tunnels and parking garages.

"How do we quantitatively measure risk — the risk of human health hazard and the risk of environmental damage — and compare them with benefits? This risk/benefit problem is not unique to PCBs," Craddock says.

• • • •

Unfortunately, the risk/benefit problem goes further than PCB. In a rather macabre way, it now extends to *dioctyl phthalate* or DOP, which is one of two synthetic chemicals being used to replace PCB as required by law.

Recent animal tests on DOP have concluded that — guess what? — DOP causes cancer in female rats.

"Where does it end? I don't really know," said James W. Gunter, who is in charge of PCB regulation for the U.S. Environmental Protection Agency (EPA) in Washington, D.C.

Peter Ackley of the EPA's chemical control division, however, admits that his agency has issued some arbitrary "toxic levels" when it comes to PCBs. For instance, anything with more than 50 parts-per-million (ppm) of the chemical represents a health hazard and must be placed in steel barrels and housed in a designated PCB landfill. Any substance with more than 500 ppm of PCB must be incinerated.

But many PCB-filled appliances, like fluorescent light ballasts, contain less than 50 ppm of PCB. Yet, because PCB "bioaccumulates" in the environment — which means it continually builds up and does not break down — thousands of fluroescent light fixtures thrown into thousands of city dumps pose a very real health risk.

"We decided to make 50 ppms our cutoff in terms of what we believe is an immediate health threat," Ackley said.

Although Ackley agreed that 10,000 fluorescent light fixtures containing PCBs in a 5 ppm concentration each yields 50,000 ppm of the chemical — which is way over the EPA's health hazard level — "we were forced to draw the line somewhere," he said.

Doesn't that mean that despite government regulations, PCBs will continue to bioaccumulate, if only at a slower rate?

"I don't think you can say that," Ackley said. "The substance does bioaccumulate and to that we can only say that the greater levels of PCB are of more concern to us at this point. We do not feel it's necessary to issue special requirements for anything containing under 50 ppm (of PCB) at this time."

• • • •

Polychlorinated biphenyls got their bad name from what is now referred to as "the famous Yusho incident," which occurred in Japan in 1968.

An industrial accident in the city of Yusho caused some PCB oil that had been used in a heat transfer unit to escape. The unit was being used to heat rice oil which the plant packaged.

"The PCBs went into the environment unnoticed and vast amounts of rice oil were contaminated," said Monsanto's Dan Bishop, director of environmental and science communications. "These amounts were very vast; they were in the 2,000 to 3,000 parts-per-million range."

Some 1,200 Japanese who ate the contaminated rice oil "developed a number of unpleasant and unhealthy reactions," according to a March 1980 regional report by the U.S. Food and Drug Administration. Most of the Japanese became nauseous, developed a painful acne called chloracne and complained of skin rashes and respiratory problems.

Today, however, scientists are questioning whether PCB was the real — and only — culprit in the Yusho incident.

There is evidence now that a second toxic chemical, called *di-benzo-furan,* was present with the PCB and had been produced as an "undesired side-product in the Japanese manufacturing process," said Ralph Komai, a scientist with the national Electric Power Research Institute in Palo Alto.

"In the manufacture of PCB, the Japanese produced high levels of di-benzo-furan and it could be that we're chasing the wrong animal in going after PCB," Komai said.

Unlike the Japanese process, Monsanto's production of PCB never yielded bi-benoz-furan.

The toxicity level of di-benzo-furan is estimated to be 500 times that of PCB, an EPA test found. And, some EPA officials like Dr. Frank Whitmore, believe that the bi-benzo-furan was the real toxin in the Yusho incident.

But in 1968, the rice oil in Japan was not that closely examined and PCB was singled out "as the villain," Komai said.

• • • •

PCB-ARCH-EXT0371315

In 1972, due in part to the Yusho incident an animal test was begun at the U.S. Center for Dis Control in Atlanta, Ga. by Dr. Renata Kimbrc on the effects of PCBs.

Her test results, released in 1975, found that PCBs were "suspected of causing cancer" in the livers of female rats.

Several independent tests later, Kimbrough's results remain unverified and unreplicated. No one — including researchers at the National Cancer Institute — could come up with the same results.

In the follow-up tests by the National Cancer Institute, the EPA and Monsanto Co., some of the rats exposed to PCB did suffer liver damage but none of them, female or male, contracted cancer of any kind, results show.

In fact, studies now show that the toxicity level of PCBs — that is, the amount at which they are lethal to humans — is the same as another "slightly toxic" chemical, common table salt. Tests show that three cupsful of either chemical would kill most 160-pound adults if taken orally.

The concern about PCB stems from on-going animal studies which show that when rats are fed large doses of the chemical over a two-year period they develop a variety of health problems, including liver damage, miscarriage, birth defects, digestive ailments, throat and respiratory irritations.

Taken to a human level, some scientists fear that cumulative PCB exposure could cause those problems and more, including impotence, severe headaches, a darkening of the skin, jaundice, and chloracne.

Seven epidemiology studies — conducted over a 30 to 40 year period to trace the outbreak of disease among a specific population of people — have failed to detect any long-term health effects from PCB exposure. Even when populations with large numbers of utility workers were studied, the results remained unchanged, leaving scientists to question what real side-effects PCB poses.

"There have never been any documented incidents of anyone developing chronic ailments because of PCB," said Monsanto's Craddock. "It is true that some workers who spent years literally up to their elbows in the stuff reported having some liver problems. But those problems were reversible and when the PCB exposure was removed, so was the problem. There has never been a reported case of cancer from PCB, either."

CAUTION
CONTAINS
PCBs
(Polychlorinated Biphenyls)

A toxic environmental contaminant requiring special handling and disposal in accordance with U.S. Environmental Protection Agency Regulations 40 CFR 761 For Disposal Information contact the nearest U.S. E.P.A. Office.

In case of accident or spill, call toll-free the U.S. Coast Guard National Response Center. 800-424-8802.

Also Contact _____

Tel. No. _____

This is the marking format the Environmental Protection Agency requires on all PCB containers.

Those arguments are academic now, as far as industry officials are concerned.

For them the bottom line is that PCB must be replaced and kept in highly secure storage areas until it can be destroyed.

And that bottom line is expensive.

The cost of properly packaging PCB contaminants into 55-gallon barrels and transporting the drums to a designated landfill is high. In fact, PCB disposal has become so costly and complicated that some EPA officials fear massive amounts of illegal, "midnight dumping" are resulting.

One such illegal dump was recently found near San Bernardino County in the remote desert town of Llano where 27 barrels of PCB were illegally abandoned. No one knows where the PCB came from or how long the barrels had been there. By the time the illegal dump was found, the chemical had seeped more than 20 feet into the ground.

"Getting rid of the PCB has become the most major problem of all because no one really wants to pay to get rid of it," Dr. Paul Williams of the state's Hazardous Materials Management Division in Berkeley said.

"Any company using PCB has to find a landfill authorized by the EPA to take it. There's only on such landfill in California and that's the Casmalia disposal site in Santa Barbara County," Williams said.

The Casmalia site charges $150 for every ton of PCB it accepts. Tacked onto that cost is the reserved storage space fee which ranges from $2,500 to $1,000 a year, depending on the amount of square feet required to house the barrels of PCB.

"The PCB problem — if it's a problem which I don't think it is — will be around a long, long time," Monsanto's Craddock said. "And it's going to end up costing the consumers billions and billions of dollars to replace perfectly good equipment just because PCB has come to be seen as some sort of public menace. It's ridiculous."