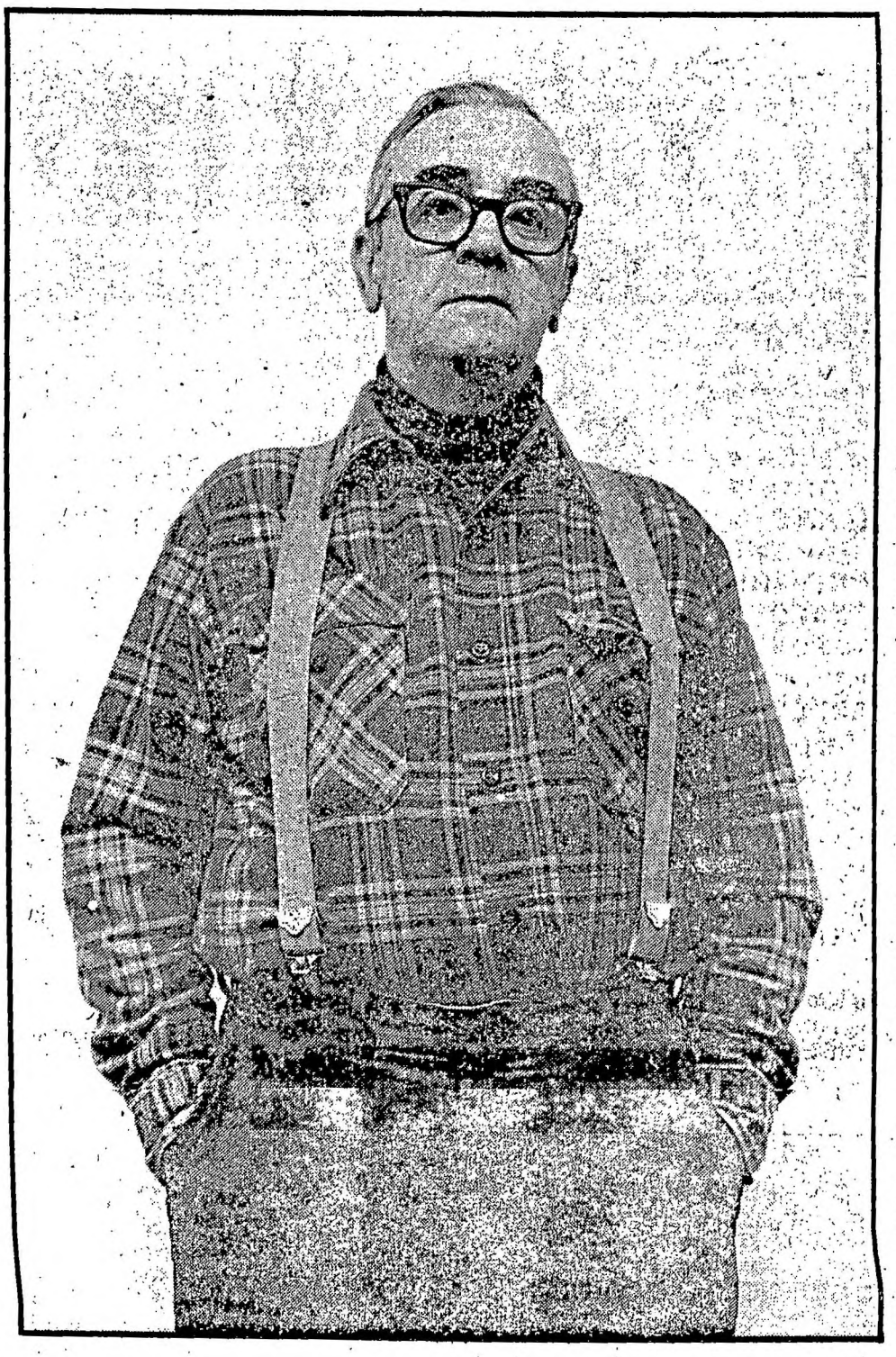


A Question of Contamination

When GE closed its Holyoke plant 15 years ago, did it leave behind a legacy of deadly PCB pollution?

By Paul Bush and Don Michak

For nearly 20 years the General Electric Company operated a plant in Holyoke which manufactured electrical transformers containing polychlorinated biphenyls, or PCBs. The chemicals may have contaminated the Holyoke Canal system, the Connecticut River, and Pioneer Valley landfills. Workers exposed to the highly toxic compounds may have suffered serious health problems, and their families may have been exposed to PCBs brought home on workclothes. PCBs are suspected of causing cancer in humans.

According to a company spokesman, the Holyoke plant was located at 64 Jackson Street near one of the city canals. The plant operated between 1945 and 1965 and at one time employed more than 1,000 workers. GE confirmed the factory used "Pyranol," an oil mixture containing PCBs. The company, however, has never informed the state Department of Environmental Quality Engineering (DEQE) that PCBs were used at the site.

"That may be true (that PCBs were used), but that's not what GE told me," said DEQE engineer Walter Schwartz, who handles PCBs problems in Western Massachusetts. Schwartz said a few state officials are aware the company used PCBs, but because there has been no official notification the area has not been tested for chemical contamination and there are no plans to do so.

High levels of PCBs were detected in Connecticut River fish from 1967 to 1969, according to Senior Staff Scientist Ian Nesbitt of the Massachusetts Audubon Society. Nesbitt said the chemicals were found in fish caught at a Windsor Locks, Conn. testing station, which is the nearest station to the site of GE's Holyoke plant.

Other GE Polluters

General Electric denies that there may be PCB contamination of the canals, the Connecticut River, or local landfills. Transformer plants operated by GE in other areas, however, have routinely dumped PCBs into rivers and landfills. Two GE facilities in New York are responsible for the PCB contamination of the Hudson river. Fishing is now prohibited in the Hudson to prevent human contamination. Cleaning up the highest concentrations of the chemical is projected to cost $40 million. Seven landfills near the plants have also been contaminated. GE has agreed to pay $7 million for their clean-up.

In Pittsfield, the parent factory of the Holyoke plant has been blamed for contaminating the Housatonic River through direct discharges of PCBs. The river was placed off limits to fishermen in 1978, and environmental officials from both Massachusetts and Connecticut are monitoring the movement of PCBs in river bottom sediments.

In the Lakewood neighborhood of Pittsfield, PCBs have been discovered leaking into basements. Pyranol, the insulating oil made with PCBs, was found leaking from underground storage tanks. GE has spent almost $10 million to prevent further damage. Four homes with the highest levels of contamination have been bought by the company. Testing of homeowners in the area and of workers from the plant is underway. The Massachusetts Committee on Occupational Safety and Health (MassCOSH) is sponsoring one study and the Massachusetts Department of Public Health has another planned. GE has offered to examine current employees.

The Holyoke site has received no such attention. There have been no studies of ex-workers or of the plant site. Local health officials are uninformed about the potential danger. "We had contacts with GE, but we've been told nothing about PCBs or Pyranol," said Walter Cordes, director of the Holyoke health department.

The factory opened in 1945 to handle the demand for transformers that could not be met by GE's Pittsfield plant. A 1949 newspaper account described it as "a satellite to the major apparatus division in Pittsfield." According to Walter Smith, a former superintendent and plant manager, "The Holyoke manager reported directly to the top manager in Pittsfield."

The plant was housed in a 14-building complex located by the second level canal. Today the Northeast Wire Company occupies the only building left from the original plant. The rest were demolished in the mid-'70s.

At the height of production more than 1,000 workers were employed. Distribution transformers, which are used to bring electric current down to the proper voltage for household use, were the primary product. "At one time that plant produced more oil-filled, pole-type transformers than any other location," said Walter Smith.

When a newer factory was built in North Carolina the production of distribution transformers was moved there. The Holyoke plant began to build special transformers. At one time it was known as the specialty department within GE.

"One of our big things when we became a specialty plant was that we made precipitor transformers; we shipped them all over the world," said Kenneth O'Brien, who worked as a foreman. Precipitor transformers are used to precipitate, or clean, dust and other particles from the air. The original precipitor transformers for the Mt. Tom coal plant were built in Holyoke.

The Jackson St. plant also made transformers for military and scientific use. "We built a lot of big radar transformers," said Kenneth O'Brien, "we also built testing transformers up to one million volts." Subway system transformers were also made in Holyoke. "They made hundreds of them every year for New York City," said O'Brien, "and they're all Pyranol filled."

Pyranol is a trade name for the insulating oil General Electric made with PCBs, which can resist heat without ever breaking down. "Any transformers to be used inside a building were Pyranol filled because it didn't burn," said Robert Stephens, a former Holyoke plant manager.

Another insulating oil without PCBs was used to make outdoor transformers, according to one former employee. "On the regular transformers we used all 10-C oil, but on the 'precips' and other smaller ones we used Pyranol," said Lloyd Engle, who worked in the Holyoke and Pittsfield plants for more than 32 years. "The trouble with 10C oil is that it would burn," said Engle. However, the PCBs in Pyranol may pose a greater danger than the fires they were meant to prevent.

The same characteristics which make PCBs so valuable in electrical manufacturing create problems when PCBs are released into the land, air or water. Because of their chemical structure they rarely break down, creating the possibility that PCBs will always be part of the environment. They are not soluble in water, but drop to the bottom of rivers and lakes instead of being flushed downstream. There they can become part of the food chain. PCBs can also be released into the atmosphere. They can be inhaled, absorbed through the skin or swallowed. Once in humans they collect in the liver and fat and are extremely hard to excrete. Because of all these characteristics it is estimated that *everyone* has at least traces of PCBs in their systems.

What Precautions?

The Pyranol was compounded at the Pittsfield GE plant. "We had a tanker we sent to Pittsfield and it held 3,000 gallons probably," said Kenneth O'Brien. "We'd bring it in and work out of the tanker." There are no records of how much Pyranol was used at the plant but manager Robert Stephens said, "We used relatively small amounts of it compared to Pittsfield."

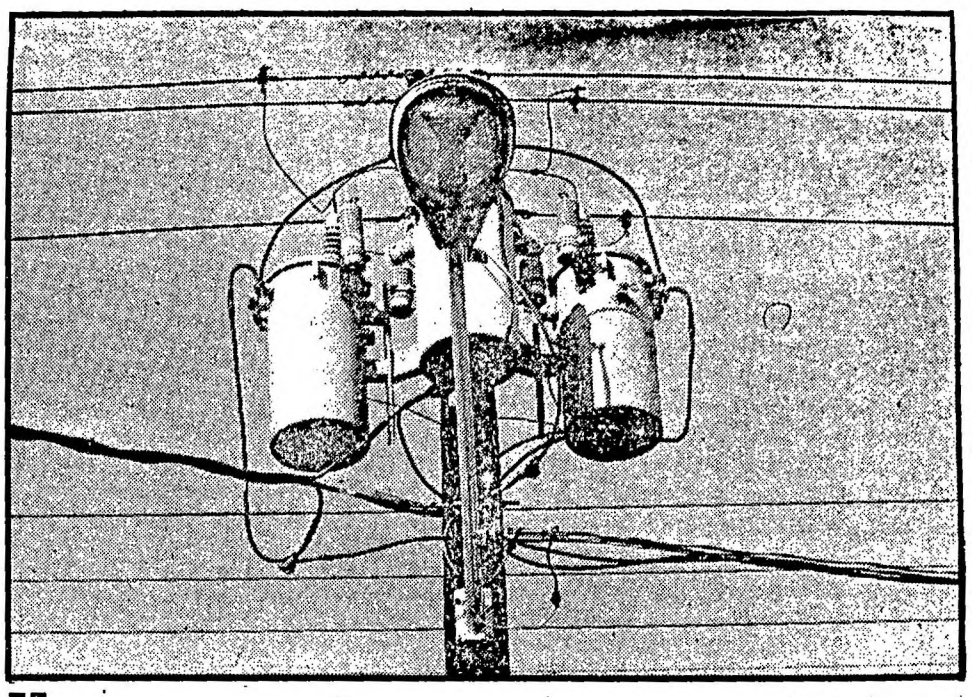
According to Stephens, precautions were taken with the Pyranol. "Around the oil tanks there were bunkers to completely hold any oil if it should puncture." Stephens added that "signs were posted everywhere that no oil or anything was to be dumped in the river. As far as we know we never had any spills or anything that would cause a problem." Workers were also instructed to take precautions, according to Stephens. "The people who handled it were supposed to wear rubber gloves," as well as keep it off their clothing.

Workers involved in production described a different picture. "As far as I recall there was nothing to protect the workers or the environment," said Abraham Hoffman, who worked in the plant for nine years. "You used to get soaking wet," said Lloyd Engle. "I worked in Pyranol all the time." Workers immersed the transformers in tanks of oil prior to moving them into treatment ovens. "You were lifting things wet," said Engle. "I wallowed in it for 35 years," said Kenneth O'Brien.

Engle described another problem that may have led to PCB contamination. "Sometimes the oil tanks would overflow, not very often, but in transporting the transformers around they'd spill. It would get into the sewers then." Walter Smith confirmed Engle's statement: "Some of it may have spilled on the floor and gotten into the drains that way." The drains and sewer lines emptied into the canals.

The canal was part of the 4½-mile-long system in Holyoke which flows into the Connecticut River. The GE facility did not regularly discharge production process waste into the water, according to former workers

See PCBs



Utility company spokesmen refused to say how many electrical transformers containing PCBs or PCB-contaminated oil remain in use in the Pioneer Valley. Ed Collins, Business Agent for IBEW Local 455, maintains routine spills and accidents have exposed local utility workers to PCB transformer oil "for years and years." Lloyd Engle (top), a GE worker for 32 years, said he "worked with Pyranol all the time." Pyranol is an insulating oil made with PCBs, a suspected carcinogen. General Electric has no plans to test former workers at the Holyoke plant for PCB poisoning. (Tobey photos)

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The ABCs of PCBs

Polychlorinated biphenyls were discovered by Theodore Swann in 1929. The Monsanto Company became the sole PCB manufacturer in the United States the following year and produced more than 1.4 billion pounds by 1975. Monsanto halted production that year, just prior to strict new federal regulations taking effect.

Considered harmless for many years, PCBs were used in many consumer products, such as carbon-less copy paper, adhesives, caulking, lubricants, printing ink, and paints. The dangers of PCBs became known too late; more than 440 million pounds, almost one third of all PCBs used in the United States, had been dumped or lost into the environment by the time the Toxic Substances Control Act prohibited their further manufacture and established strict rules for their disposal.

PCBs were first shown to be dangerous in the 1930s. Tests for short-term exposure revealed that PCBs could cause a severe skin disorder known as chloracne, liver damage and neurological problems. In 1968 in Kyushu, Japan, cooking oil was contaminated with PCBs from a leaking transformer. Over 1,000 people suffered from what was later called Yusho disease. Some of the symptoms were chloracne, loss of hair, fatigue, numbness of extremities and abdominal pain. The victims are still being monitored for long term nuerological problems and other effects.

Careless dumping into rivers and landfills, unchecked release into the air and widespread use in commercial products have made PCBs an almost universal contaminant. Since 1966, when they were first discovered in animal tissue by a Swedish scientist, PCBs have been found almost everywhere, including Antarctica and in organisms 11,000 feet down in the ocean.

PCBs have also entered the food chain and the specter of widespread human contamination has been raised. In 1970 the Campbell Soup Co. found PCBs in chickens and 146,000 had to be destroyed. In 1971 123,000 pounds of egg products and 88,000 chickens were destroyed when fish meal the chickens fed on was found to be tainted. In 1979 animal feed from a Montana company was discovered to be contaminated. By the time the Food and Drug Administration learned of the problem the PCBs had contaminated hogs, chickens, eggs and products made with eggs in 19 states, Japan and Canada. More than 325,000 chickens, 4 million eggs, 3,000 hogs, and 12,000 cases of frozen strawberry cakes had to be destroyed.

The Environmental Protection Agency has estimated that 91 percent of Americans have detectable levels of PCBs in their tissues. Once accumulated, the chemicals almost never leave the body. One tragic exception is that nursing mothers pass them on to their children. An EPA study showed that of 80 women tested in 11 states, 79 had substantial levels of PCBs in their breast milk.

Massachusetts has suffered from PCB contamination incidents. In 1974 shellfishing was banned in the New Bedford harbor and the Acushnet River because of PCB pollution from two New Bedford companies which also dumped an estimated 500,000 pounds of PCBs in the New Bedford municipal landfill.

The Hoosic River has also been contaminated with PCBs. Suspicion has focused on the Sprague Electric Company of North Adams, which manufactured capacitors containing PCBs and discharged material into the river as well as dumping it in the municipal landfill.

PCB contamination has been discovered in the Pioneer Valley. In 1976 Dr. Salvatore DiNardi and graduate students from the UMass environmental health sciences program found PCBs leaching from the Amherst landfill. The source is still unknown. "That's one of the nagging questions," said DiNardi, "Where did they come from?"

The state Department of Environmental Quality Engineering has no plans to test the Amherst landfill or any others in the area that might be leaching PCBs. According to the 1979 "Chemical Contamination Report" issued by the Special Legislative Commission on the Water Supply, "The major emphasis to date has been on the Housatonic River (receiving discharges from GE and vicinity) and the Hoosic River (receiving discharges from Sprague and vicinity)." Unless attention is directed towards other areas, it is unlikely that all of the Valley's PCB problems will be addressed.

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PCBs

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and managers. However, it was standard procedure for sewer lines and drains to open into the canals.

PCB contamination also may have occurred when material was dumped in landfills. "You had solid waste, like broken porcelain bushings, which was hauled away and I suppose used for landfill," said Robert Stephens. Material used to clean up spills was also dumped. A commercial compound called speedy-dry was thrown on the spills to absorb the oil and "then it was thrown out," according to Lloyd Engle. The danger presented by dumping was not understood during that time. "We weren't conscious that by today's standards there may have been hazardous waste," said Walter Smith.

Holyoke had two municipal landfills during the period of the GE plant's operation. Both have since been closed, and construction has taken place on the sites.

PCBs also may have been released into the air in Holyoke. Waste paper and other combustible products were routinely incinerated at the plant and some PCBs may have burned. Heated air from ovens may have carried PCBs into the atmosphere. One worker, who asked not to be named, complained that fumes from the ovens escaped into the work area.

Nonetheless, DEQE official Walter Schwartz does not think there is a threat from PCBs in Holyoke. "There are two possibilities: that there is material in the ground or discharged into the water. They don't present much danger," because there are no direct routes for human contact.

Dr. Salvatore DiNardi of the UMass environmental health sciences program agreed, "Unless people are exposed to a spill or it's brought home on work clothes, there's probably not much of an exposure problem." However DiNardi raised another problem, "Do people eat fish from the river? Today they don't and 10 years ago they didn't, but what about 20 years ago?"

Workers run the greatest risk of PCB exposure. In Pittsfield where contamination has been documented, testing is underway. General Electric has offered exams to any of its workers there who want them. MassCOSH has undertaken a project to test for PCBs in workers at the plant and in homeowners from the Lakewood area. Eighty people were tested Sept. 28 and according to Dr. Kenneth Rosenman, who is supervising the testing, "We had to turn people away." The results will not be known for several months.

Workers may also have tracked Pyranol home on their shoes or their clothes. Studies have already shown that families can suffer from workplace chemicals even though they have never entered the factory.

Many causes of PCB contamination occurred because the chemicals were considered harmless for so many years. No precautions were thought necessary when

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handling or disposing of them. Workers in the Holyoke plant did raise some questions, though. "It did burn your nose. We used to say 'is this stuff good to work with?' and they'd say 'sure.' We had to take their word for it," said Lloyd Engle.

Superiors did not realize the problem either. "If I knew then what I know now I wouldn't have been as free in handling it," said Kenneth O'Brien.

For workers disabled by PCB exposure legal recourse may be limited to workmen's compensation. Current Massachusetts law allows a maximum of $240 a week, or less than $12,000 a year, for total disability. Payment for partial disability is limited to only two thirds of weekly wages.

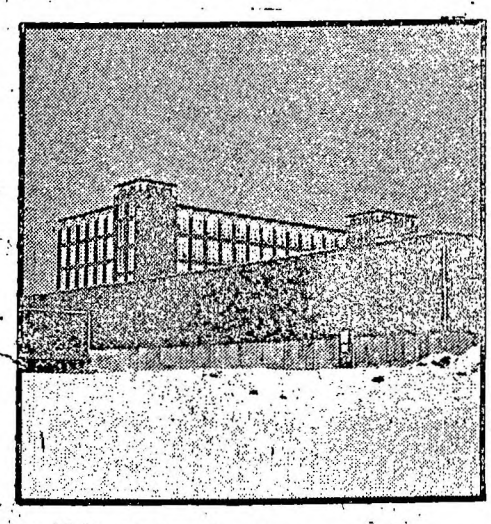
One former employee is attempting to sue General Electric for cancer he says was caused by exposure to PCBs.

How Much Escaped?

What has become of the PCBs General Electric used at the Holyoke factory? Company officials contend that because of the high cost of Pyranol, PCBs were contained on site and recycled. "These wastes would be transported back to Pittsfield," said GE Area Communications Manager Joel Hutt, "but I can't absolutely verify that." According to Hutt, GE's records on the Holyoke operation make no mention of PCB disposal by other means. Engineers familiar with the plant told Hutt solid wastes were burned at the site.

Serious questions remain, however, as to whether PCBs may have contaminated Holyoke's air, water, and soil. PCBs may have been released into the atmosphere by burning contaminated solid wastes at temperatures too low to properly incinerate the heat-resistant chemicals. Plant wastes which were not burned may have been taken to local landfills where operators routinely received industrial waste often contaminated by chemicals. (As we reported in "Poisons in the Valley," June 25, PCBs have reportedly been dumped in one of the area's largest waste facilities, the Ahearn Trucking Company of Chicopee.)

Operational losses and "minor" spills appear to have been common at other General Electric plants operating during the same period. Testimony by Dr. Edward L. Simons of GE at an EPA hearing on toxic pollutant effluent standards in 1974 revealed other company plants routinely released PCBs into their local environments. Transformer and capacitor factories in Pittsfield, Mass.; Fort Edward, N.Y.; Hudson Falls, N.Y. and Rome, Ga. discharged PCBs into local rivers and a sewage treatment plant. No PCB discharges involving the Holyoke plant have been recorded, according to local and state pollution control officials, who only recently learned PCBs were used at the site. According to DEQE's Walter Schwartz, PCB testing just "can't be a priority" at the agency because of DEQE's limited financial and laboratory resources.



Only the building now occupied by Northeast Wire Company remains on the Jackson St. site of GE's Holyoke plant, shut down in 1965. (Tobey photo)

Symptoms of Exposure

Workers and others exposed to PCBs may have experienced nausea, dermatitis, dizziness, bronchitis and eye irritation. Medical reports since the early 1930s have established the toxicity of PCBs, which have been linked to chloracne and liver damage. PCBs were shown to be carcinogenic in lab rats and mice in 1975 and were banned by the Toxic Substances Control Act in 1979. Human injestion of PCBs has caused numbness of limbs, deformities of bones and joints, and stillbirths.

The earliest reports of adverse health effects due to exposure of workers to PCBs in the U.S. came in 1936, when skin lesions and symptoms of systemic poisoning were reported among workers who were said to have inhaled chlorodiphenals. The workers' complaints included digestive disturbances, burning of the eyes, impotence, and hematuria. Similar effects have been reported over the ensuing years among marine electricians, machinists, and capacitor and transformer workers.

In one study of 800 electrical workers at two capacitor manufacturing plants in New York, employees with more than 10 years on the job reported many dermatologic and central nervous system symptoms including acne, rashes, discoloration of fingernails, darkening or thickening of skin, headaches, dizziness, depression, nervousness, sleeplessness, and others. These were also among the most common features of PCB poisoning identified after rice oil was contaminated on the Japanese island of Kyushu.

Nearly all non-occupational exposure to PCBs has resulted from contamination of food. PCBs have been regularly found in fish from lakes and streams, they have been leaked and spilled into animal feed, and they have been detached at significantly high

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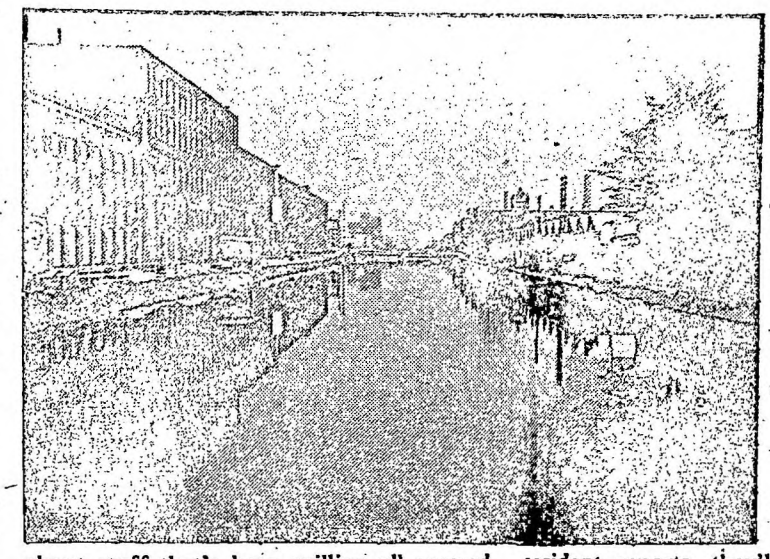
levels in certain food packaging materials.

Electrical transformers similar to those made by GE in Holyoke are still used in the Pioneer Valley. Transformers filled with PCBs or with mineral oil contaminated by PCBs are mounted on utility poles in many of our neighborhoods, according to local utility company sources. Neither Massachusetts Electric nor Northeast Utilities spokesmen would provide the actual number of PCB transformers remaining in the area. Both companies have been phasing out PCB transformers, which must be marked by a bright yellow tag identifying them as hazards to utility workers.

Union Responses

Ed Collins, business agent for IBEW Local 455 in Springfield, said local utility employees "have been exposed to this stuff for years and years. Some of our people are very concerned about PCBs, especially some of the younger guys." According to Collins, some of the older workers dismiss talk of hazards resulting from PCB exposure because "it's a kind of defense mechanism, you know, to say, 'I can't believe that' about stuff that's been spilling all around them." Collins' local has stepped up its efforts to get more information about PCBs and other hazardous materials from utility companies during safety bargaining at contract time.

As a "small part" of an overall hazardous materials policy, Collins says the union has developed an accident-reporting procedure to document routine exposure to PCBs and other hazardous materials. "We've got to make the company pay more serious attention to the problem, and even if some of the risks are being exaggerated now, when they see that swelling file of accident reports, they'll have to do more than they are now."



Are the canals of Holyoke contaminated with PCBs from the defunct GE plant? There is reason for suspicion, but no state testing to provide definitive answers. (Tobey photo)

No local, state, or federal agency knows whether PCBs used by General Electric in Holyoke have sickened workers or contaminated the environment. No tests have been done and none are planned. General Electric says there is probably no danger posed by its former operation, but the company has a history of being wrong about dangers posed by its PCB operations elsewhere.

Some people interviewed for this story have suggested the company immediately make available all of its Holyoke records for inspection by DEQE, OSHA, and public health officials, and that it provide the regulators access to company personnel who are familiar with the operation. More than one worker suggested that the company immediately survey the health of everyone occupationally exposed to PCBs at the Holyoke site, and that the company rather than the taxpayers bear the costs. As one of the largest multinational corporations doing business, General Electric has the resources available to provide answers to the workers and citizens of Holyoke.

When GE opened its plant in the city in 1945, the local newspaper published an editorial entitled "Red Letter Day." "It will be well to bear in mind," reads the editorial, "that this royal gift dropped in our lap carries with it sizeable responsibilities on our part." After 20 years of the community meeting responsibilities to the company, it may be time for GE to return the favor. □

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