Monsanto

FROM (NAME & LOCATION) E. V. John - St. Louis

DATE October 8, 1969

SUBJECT

REFERENCE

cc: Mr. J. J. Spano - JSPAN
Mr. W. R. Richard - WRICH
Mr. E. P. Wheeler - EWHEE
Mr. M. W. Farrar - St. Louis
Mr. D. B. Hosmer - DHOSM

TO : Field Sales Offices
Plant Communicators
Pollution Control Engineers
Plant Managers

C O N F I D E N T I A L

You are probably aware that for the past seven months there has been considerable interest in the possible environmental contamination by polychlorinated biphenyls (PCB). The subject first came up in the U.S. in connection with a research study done by a Dr. Robert Risebrough of the University of California. Dr. Risebrough was investigating the possibility of environmental contamination by DDT when he discovered an "interfering substance" which later was identified as PCB.

The San Francisco Chronicle published a story based on these findings. Further DDT investigations by government, state and university laboratories have substantiated that PCB's are showing up in the environment, generally in the parts-per-billion range, but occasionally in the parts-per-million range.

PCB's are manufactured by Monsanto and marketed under the trade name Aroclor. (There are other producers in Europe and Japan).

We have received numerous inquiries from the press and private, governmental and university laboratories for information about PCB. In some cases, requests have been made for samples of our Aroclor products. Monsanto's position is one of complete cooperation. A position statement has been prepared and is furnished to news media on request. To date no major national publicity has appeared. The company recently has appointed a task force to gather information and to make recommendations for future actions to protect our position in the manufacturing, marketing and customer use of Aroclor products.

This memo is to alert you to the procedure for handling inquiries. Should you receive a request for information concerning PCB's from any source (press, government, university or private citizen) please direct the inquiry to St. Louis. If the request comes by telephone, take the name, address, return phone number and the nature of the inquiry. By providing information from one central source, we can project our corporate position of cooperation, and emphasize our efforts in research and study being directed to eliminating any possible contamination sources.

DSW 203040

IN 10 REV 11 65

Following are the individuals in St. Louis to whom inquiries may be directed for prompt action:

Mr. Elmer P. Wheeler, Medical Dept., Sta. 2196
Mr. Ed John, Public Relations Dept., Sta. 2891

Your cooperation in handling inquiries on PCB's and Aroclors as suggested will be appreciated, and hopefully will result in greater control over the flow of information.

E. V. John
Public Relations Manager
Organic Chemicals Division

Paul B. Hodges
Manager of Environmental Engineering
Organic Chemicals Division

EVJ-PBH/stw

P. S. Attached are newspaper clippings which may provide some background on the present controversy.

S. F. Chronicle Feb. 24, 1969

A Menacing New Pollutant

By David Perlman
Science Correspondent

The peregrine falcon, a bird of prey that once abounded all over America, is bearing a bitter warning to man:

A newly-identified chemical pollutant has arisen on our planet: it threatens not only the existence of falcons and countless other birds, but its molecules are already entering the bodies of humans.

Its long-term hazards at low levels to the human species are wholly unknown — although in concentrated gaseous form the chemical is highly poisonous, and chemicals closely related to it are known cancer-causers.

In California the pollutant is widespread; in the San Francisco Bay Area, where many industries use many varieties of the compound, the chemicals have concentrated heavily.

The new pollution threat is a class of organic chemicals called polychlorinated biphenyls. Few laymen have ever heard of them, yet they

See Back Page

20 San Francisco Chronicle Mon., Feb. 24, 1969

SAN FRANCISCO CHRONICLE
FEBRUARY 24, 1969

Bay Scientist's Pollutant Warning

From Page 1

are a major boon to industry: they are used in making eons form the chemical is paints and plastics, electrical insulators and rubber tires, waxes, sealants and epoxy resins.

Despite their widespread use, in America they are made only by Monsanto Chemical Co., which markets many forms of the compounds under the trade name of Aroclors.

They apparently enter the atmosphere and marine environment by vaporizing, venting from factory stacks, by waste discharge into waterways and even by the abrasive wearing of tires on freeways.

Their chemical structure is very similar to that of DDT, the potent and long-lasting insecticide. Both DDT and the biphenyls are known as chlorinated hydrocarbons, and in the words of a Berkeley researcher they are now "the most abundant synthetic pollutants present in the global environment."

The Berkeley scientist is Dr Robert W. Risebrough, a researcher at the Institute of Marine Resources in the University of California's Department of Nutritional Scientists.

Dr. Risebrough and a team of colleagues from Davis, San Diego and Cornell University in New York, have been alerting ecologists to the hitherto unsuspected prevalence of the byphenyl compounds and to their invasion of man's environment.

FALCON

They have published their findings in the British science journal Nature, in its American counterpart Science, and have discussed it at conferences on environmental poisons. Risebrough will be presenting more evidence on the problem at a La Jolla scientific meeting on the "Chemical Invasion of the Ocean."

In an interview with The Chronicle recently, Dr. Risebrough described the new pollution menace, and how he came upon it.

The tale is an ironic one, for it all started with the peregrine falcon. That bird, once described by an eminent ornithologist as "the embodiment of noble rapacity and lonely freedom," is now extinct as a breeding species in the eastern United States and southern Canada.

Its rapid population decline during the years right after World War II — when DDT was first introduced as a major pesticide — first served to alert ecologists that a new poison might be damaging the environment.

DDT

Investigations showed the falcon was succumbing by preying on birds that had ingested large quantities of DDT, a chemical that concentrates in animal fats. So the falcon, in a sense, was man's first messenger to carry the warning that DDT was befouling the world.

And just as Spartan kings slew their messengers who bore bad news, so the falcon is being slain today as it carries the news of the new chemical pollutant. Eighty percent of California's breeding peregrine falcons, Dr. Risebrough estimates, have now been destroyed.

It was barely two years ago that Dr. Risebrough, on an expedition to Baja California, found an unhatched abandoned egg of a peregrine falcon. He analyzed the egg's contents, found DDT in it, and also found it contained another unidentified chemical.

PCB

Later that same chemical was found in the fat of European birds and Swedish scientists identified it as a polychlorinated biphenyl, which was to gain its scientific notoriety as PCB.

Dr. Risebrough and his colleagues then began an exhaustive hunt for PCB in birds and fish along the West Coast. They are still at it.

They have found, for example, that PCB is present in almost all birds of prey, but its quantities are largest in those birds that feed on fish or fish-eating birds. The material, like DDT, apparently starts concentrating in the lowest links of the marine "food chain" — the microscopic oceanic plants and animals — and becomes more and more concentrated as tiny fish eat plankton, bigger fish eat small fish, and birds eat bigger fish.

Peregrines preying on Pacific sea birds have now virtually vanished Dr. Risebrough reports. But small inland colonies of California falcons, which prey mostly on doves and songbirds, still appear to be reproducing normally.

In hundreds of analyses of birds and their eggs Dr. Risebrough and his colleagues have found only about a tenth as much PCB as DDT among birds from relatively uncontaminated areas. But in birds from the Farallon Islands the PCB quantities are higher — between a fifth and a half the DDT.

In birds and their eggs from polluted San Francisco Bay — falcons, gulls, terns and night herons — there is often more PCB than DDT.

Dr Risebrough and his colleagues point out that all the chlorinated hydrocarbons, like DDT, cause enzyme changes in animal livers and that these new-formed enzymes break down many vital hormones, including sex hormones. In laboratory experiments with pigeons, using a biphenyl compound called Aroclor 1262, made by Monsanto, Dr. Risebrough's group has found that PCB is five times more powerful than DDT in its hormone-destroying activity.

The sex hormones, according to Dr. Risebrough, play an important role in calcium metabolism, and as a result of the pollution by PCB and DDT the eggs of birds like falcons are now far thinner and more fragile than they used to be.

HUMANS

The calcium-deficient eggs break prematurely and fail to produce hatchlings. Thus the decline of the falcon — the end of its evolutionary road. It had adapted over millions of years to its natural environment but it could not survive as a species in an environment altered by man's new chemicals.

And what of the effect of the biphenyl compounds in humans? The compounds have already been found, ominously, in the milk of mothers analyzed by Dr. J. H. Enderson and Dr. F. A. Beland at Colorado College, and Dr. Risebrough is now hoping to test for their presence among nursing mothers here.

As Dr. Risebrough has written: "They are highly toxic to man when inhaled as vapors, and the more heavily chlorinated components have greater toxicity. No tolerance limits have been set for human food supplies and their cancer-causing properties remain to be determined."

FOOD

Dr. Risebrough and his colleagues have found evidence that the biphenyls, like DDT, are carried widely across the oceans by winds and water currents. Arguments that they can be used safely because they remain localized, Dr. Risebrough says, are "misleading, irrelevant and wrong."

How the PCB compounds may affect human food supplies and human lives are questions for future research. The one certainty now is that they can be found everywhere, that they have invaded the food-producing levels of the oceans, and that their presence is rising swiftly.

Officials of the Monsanto company in St. Louis were asked for comment on Dr. Risebrough's report last week. After three days of queries a company spokesman would only say that top Monsanto scientists and sales executives were studying it.

Dr. Risebrough's fellow-researchers attacking the PCB pollution problem include Dr. D. B. Peakall of Cornell; Steven G. Herman, a zoologist at Davis; Dr Monte N. Kirven at the San Diego Natural History Museum, and Paul Reiche in the marine resources lab at Berkeley.

MILWAUKEE SENTINEL
MILWAUKEE, WISC.
D. 169,011.

MAY 13 1969

Some Bird Species Called DDT Victims

By QUINCY DADISMAN
Sentinel Staff Writer

Madison, Wis. – A California biochemist testified Monday that his studies have convinced him that DDT and not another commonly found contaminant is the cause of thin eggshells which he believes will wipe out certain predatory bird species.

Robert Risebrough, Berkeley, Calif., was called as an adverse witness by the attorney defending the pesticide at a natural resource department hearing on a petition calling for banning DDT in Wisconsin.

Testified Earlier

Risebrough had testified in December for the petitioners — Citizens' Natural Resource association and the Wisconsin chapter of the Izaak Walton league — about DDE, a form into which DDT changes in living bodies and his conviction that DDE causes a metabolic disturbance in birds which leads to thin eggshells.

The thin shell cracks easily, causing the death of the embryo inside the egg.

Risebrough was called by Willard S. Stafford, Madison attorney who is conducting the defense of DDT for the National Agricultural Chemicals association.

Stafford questioned Risebrough about work he has done with polychlorinated biphenyls (PCB), a goup of hydrocarbon compounds widely used in industry. PCB's show up in some test equipment in a way that makes separation of DDT in analysis much more difficult.

Only Few Found

Risebrough said that while PCB's are found in large amounts in many marine birds, he had found only a few in which there were more PCB's than DDT or its metabolities (forms into which it changes in passing through living tissue).

He said that tests with eggs containing up to one part per million (p.p.m.) of PCB's and up to six p.p.m. of DDT in all forms showed mathematically, by correlation with eggshell thickness that DDE and not PCB's, were to blame. The tests were made mathematically, he said, with a statistical accuracy of 99.9%.

He said that damage to eggshells from DDT can be traced not only to the DDE in the bird's body fat, but also to the amount present in the food it eats.

"DDT may be comparatively inactive in the body fat," he concluded, explaining that peregrine falcons from Arctic areas seem to be sustaining their numbers better than those from more temperate climates because the food they eat while rearing a second clutch of eggs is "clean."

New Puzzle Posed by PCB Pollution

By Bill Clede

Polychlorinated biphenals (PCB) are causing a controversial puzzle that raises many unanswered questions. And the finger of accusation may be pointing prematurely.

PCB's have been found by chemists testing fish and wildlife samples for residues of pesticides such as DDT.

"It is simply astounding that the amounts of PCB being reported could possibly be present in our environment," said Tom C. Ford of Monsanto, only commercial producer of PCB in the United States.

He explained that there just isn't the opportunity for PCB's to be introduced into nature.

Polychlorinated biphenals are a class of hydrocarbon chemicals with many industrial uses. They are used primarily as insulating fluids in electrical transformers and capacitors. They are added to a polymer to make certain plastics and adhesives or surface coatings.

Although PCB's are similar to DDT, dieldrin and other chlorinated hydrocarbon pesticides, they have no agricultural use.

"PCB's would make lousy pesticides," Ford explained. "It takes 120 milligrams of DDT per kilogram of animal weight to kill a rat. It would take 5,000 to 10,000 milligrams of PCB."

In industrial uses, PCB's are self-contained. The transformer is sealed. In heat-transfer applications, the PCB fluid functions in a closed system.

In plastics, they become part of the solid material itself.

But "plastics" is a broad term.

"Now food storage bags are virtually all made of polyethylene which contains no PCB's at all," Ford reassured us. "There is no requirement of clearance with the Food and Drug Administration."

The linking of PCB with DDT first happened about three years ago. Scientists analyzing pesticide residues in wildlife, found unidentified "interfering" substances in the same range as DDT on test equipment.

Professor Gunnar Widmark and Soren Jensen of the Stockholm University Institution of Analytical Chemistry identified the interference as PCB. It shows up a peaks on the graph of a gas chromatograph very near the peaks caused by DDT.

"The gas chromatograph is sensitive," Ford said, "but you really can't make positive identification without a mass spectrometer. We have learned that the Swedes did use o[illegible]ed birds . . ."

Since Monsanto is the sole U.S. producer of PCB, the company has launched research programs hoping to answer new questions raised by chemists.

One is seeking to identify the compounds reported to the PCB's. This involves analysis of environmental samples of air, water, soil and wildlife.

Also underway are studies to determine the biological effects of deliberate dosage of PCB's on fish, birds and mammals.

But neither is complete enough yet to draw conclusions. One chemist has done 5,000 test samples but will not assume any facts until he has finished 10,000.

Dr. Robert Riseborough, a marine biologist at the University of California at Berkeley, tends to clear PCB of blame.

Testifying at the Wisconsin's Natural Recourses Department hearings on pesticides in May, Dr. Riseborough even suggested that DDT has been wrongly blamed for producing thin eggshells in some birds.

"DDE (a breakdown product of DDT) appears to be the environemtntal pollutant most responsible for thin eggshells despite the presence of PCB in some DDE-con-

Computer analysis, he said, showed "no significant statistical relationship" between PCB content in pelican eggs and the thickness of their shells. But as DDE contamination increased, "the shells became thinner" in both pelican and double-crested cormorant eggs.

While PCB's are found in large amounts in many marine birds, Riseborough has found only a few in which there were more PCB's than DDT or its forms changed by passing through living tissue.

But it is now a question whether the similarity of PCB's might have confused earlier tests for DDT.

According to Brainerd T. Peck of the State Board of Pesticide Control, tests made prior to 1968 may not have taken PCB interference into consideration.

With the advent of the gas chromatograph, Lloyd Keirstead of the Connecticut Agriculture Experiment Station says it is not likely that tests within the past couple of years would be confused.

But it's an even bigger question that if these findings of PCB's in fish and wildlife are accurate, where is it coming from?

Chemists have theorized that the source must be industrial wastes. Yet industry spokesmen know of no process that would release these chemicals. Monsanto has carried out a program for several years for the reclamation of used PCB's for re-use.

The only definite statement anyone will make is that these questions will surely expand the scope of research — but there won't be any quick and ready answers.