pollution, two involving agricultural pollution, one case calling for a discharge permit application, and four on wells.

In one of the chemical pollution cases, Carvel Hall Division, of Crisfield, was ordered to carry out immediate measures to cease untreated process waste water discharges, to submit a plan for ending the pollution, and to forward monthly progress reports. Other chemical cases involved the Washington Sanitary Commission for discharges from its Patuxent Water Filtration Plant, Essex Chemical Corporation, for discharges and spillage of latex, Kerr-McGee, for waste water discharges, National Advertising Company, for waste water discharges, and Robb Tyler Company, which was ordered to appear for a hearing on a chemical pollution case.

The wetlands actions included Wayne Beatty, of Annapolis, ordered to cease and desist filling and grading; Fred Pomery, of Cambridge, in two cases ordered to cease dredging and filling, to secure a grading permit, and to restore a filled area to its original elevation; David Hook, of Baltimore, ordered to cease dredging, filling, and grading and to submit a written report and site sketch; Edgewater Beach Corporation, of Edgewater, ordered to cease construction and make application for a wetlands license; Mrs. Leonard A. Kendall, of Baltimore, ordered to cease filling and grading and to apply for a wetlands license; and John Koegel, of Valley Lee, ordered to cease filling, dredging, and bulkheading, and to submit a plan to the administration for review.

Waterways violations noted by the report included orders to Fountaindale Development Company, of Middletown, to cease and desist work within state waters, to submit applications for a waterway permit, and to restore a site to its original condition; David Bramble, Chestertown, to cease dredging, filling, or grading, and to submit a dredging application to the administration; Anne Arundel County Department of Public Works to cease filling and related construction in Bell Branch and to apply for a waterway construction permit; and Osborne Beall, Stevenson, to remove unauthorized fill materials and to comply with local grading and sediment control regulations.

Chemicals

TOXICOLOGY SOCIETY HEARS STUDY RESULTS ON EFFECTS OF PCB, PESTICIDE INGESTION

The effects of ingesting polychlorinated biphenyls (PCBs), Aroclor 1242 and 1254, and several types of pesticides were detailed during the March 11-14 annual meeting in Washington of the Society of Toxicology.

J.V. Bruckner, of the University of Michigan School of Public Health, said that the lack of information on chronic, long-term ingestion of PCBs by mammals led to experiments on rats over a six-month period. The rats were fed ground chow with zero, five, and 25 parts per million (ppm) Aroclor 1242, and sacrificed by groups after two, four and six months.

The experiments showed alterations in a variety of biologic parameters. Increases in liver weight and total liver lipid were noted after four and six months with both five and 25 ppm dosages, as well as marked increases in urinary porphyrin excretion and liver microsomal hydroxylase activity.

Sidney Green, of the Food and Drug Administration, said that, in animals, PCBs affect liver microsomal enzymes, steroid balance, produce hyperplasia and sysplasia of the gastic mucosa, and synergize the toxicity of pesticide residues.

His experiments with rats fed both acutely and subacutely and then mated showed random, unrepeated positive effects that were not related to dose or stage sensitivity, but were considered to be due to normal variation. Green said Aroclors 1242 and 1254 do not appear to be mutagenic, as measured by the induction of dominant lethality in the rat, but his test results could not be taken as conclusive proof. Qualifications must be made since dominant lethality seems to be a result of gross chromosomal damage produced in the male germ cells, and compounds which produce more subtle damage were negative in his tests.

John Couvillion and F.L. Earl, of the Food and Drug Administration, described tests on the reproductive effects of Aroclor 1254 on beagle dogs and miniature swine. An anorectic response was induced in the dogs with a five milligram per kilogram of body weight dosage, while a dosage of 30 mg/kg was required for the pig. In both, fetal liver concentrations and fetal abnormalities showed that PCBs penetrated the placental barrier. Tissue analysis showed that adipose tissue and liver were the major storage sites for PCBs.

In another test, pregnant dogs and sows were given dosages of Aroclor ranging from .25 to 5 mg/kg/day. The lower dosages had essentially no effect on reproductive performance. The dogs and sows given dosages of 5 mg/kg/day demonstrated decreased pregnancies, and decreased number of live pups per litter at birth. There also was an increase in the percentage of resorptions and physical abnormalities.

Frederick D. Baker and Brian Bush, of the New York State Department of Health, Albany, described tests with hens and rats whereby six mg/kg of Aroclor 1254 was added to their drinking water for periods of six-nine weeks and then terminated. Results indicated that fertility was not affected at the levels of PCBs employed, and that the degree of embryonic development or termination was related to the length of exposure.

Pesticides

B.J. Norman, of Vanderbilt University School of Medicine, described experiments on the ability of rat brains and lungs to metabolize parathion to paraoxon. The results showed that the rate of metabolism was 3 percent and 10 percent respectively compared to the rate in the livers.

G.M. Benke, of the Harvard School of Public Health, examined the effects of age and sex on the toxicity and metabolism of methyl parathion and parathion in rats. Test results showed that liver and plasma of younger animals were less able to hydrolize and bind methyl paraoxon and paraoxon, indicating that alternate path-

Copyright © 1974 by The Bureau of National Affairs, Inc.

ways of metabolism must be considered in correlating age and sex differences in toxicity.

A.Y.K. Chow, of the Harvard School of Public Health, said that sex differences in liver capacity to activate 3,4-dichloroanilline (DCA), a metabolite of the herbicide propanil, were not observed in mice and guinea pigs, but male rat livers were more active than female rat livers. Test results suggest that other factors such as species differences in methemoglobin reduction may be involved, he said.

J.R. Hayes, of Virginia Polytechnic Institute and State University, Blacksburg, in discussing the kinetic parameters for binding endrin to hepatic microsomes, said the capacity of the microsomes to bind endrin was not related to resistance of the test voles. He said the absence of a difference in binding may indicate that binding and catalytic kinetic parameters are not related in the microsomes of the vole species. Dieldrin also showed no difference in its binding to microsomes, Hayes said.

J. L. Byard, of Albany, N.Y., Medical College, described the hepatic effects of Mirex on mice, with a resultant increase in relative liver weight. He said the total DNA content of the liver tended to increase as the level of Mirex and the duration of feeding increased. However, he said the concentration of DNA decreased, indicating that the new protein resulted from stimulation of RNA and/or protein synthesis.

R.W. Chadwick, of the Environmental Protection Agency's National Environmental Research Center, Research Triangle Park, N.C., described the metabolism of lindane and enzyme induction in rats pretreated with eight different chlorinated pesticides. He said in general DDT, Mirex, chlordane, and hexachlorobenzene were the most effective inducing agents, followed by Toxaphene, Pentac, and Penphene. The in vitro activity of various microsomal enzymes was increased to the greatest extent by pretreatment with Mirex, and the metabolism of lindane was significantly highest in the animals that received DDT.

F.E. Greene, of Pennsylvania State University, Hershey, told of experiments feeding dieldrin to rats in the last week of pregnancy with the resultant permanent impairment of dieldrin metabolism. Microsomal P-450 concentrations were higher in offspring of dieldrin-exposed mothers, and there were small differences in fatty acid composition of the microsomal membranes.

R. Abraham, of Albany, N.Y., Medical College, said little is known of the combined effects of two PCB compounds, and a study was made using a mixture of Aroclor 1254 and Mirex on mice. Loss of body weight, increases in liver weight, and demethylase activity were recorded, as well as structural changes in hepatic lysosomes.

Air Pollution

D.E. Gardner, of EPA's National Environmental Research Center, described a study to determine if exercise during exposure to a gaseous air pollutant increased the risks from inhaling viable organisms. Results showed a significant increase in mortality in exercise animals compared to those at rest when exposed to ozone and nitrogen dioxide.

D.L. Coffin, of EPA's National Environmental Research Center, said test results showed higher mortality from short term, high-dose exposure to nitrogen dioxide than from exposure for long periods at minimal dose levels. The infectivity model was used, he said, with parameters of increased mortality, indications of pulmonary inflammation, changes in pulmonary macrophages, and alterations in immuniological factors.

Solid Waste

AIChE TOLD ALTERNATE DISPOSAL METHODS SHOULD CONSIDER ENVIRONMENTAL CONCERNS

TULSA, Okla. – (By an Environment Reporter staff correspondent) – Alternate methods of waste disposal should consider environmental concerns and maximum resource recovery potential, F.M. Lewis, of Fluor Utah, Inc., of San Mateo, Calif., told the March 11-13 meeting of the American Institute of Chemical Engineers.

He described a new furnace that combines the mechanical simplicity of a rotary hearth with the combustion efficiency of a cyclonic combustion chamber for maximum effectiveness in thermal processing of semi-solid and solid waste. He said the furnace permits maximum energy recovery, requires low maintenance, and features automatic operation. Lewis noted that the furnace's cyclonic combustion feature results in relatively low furnace emission rates, and places a lower burden on the air pollution control system.

E. D. King, of Oklahoma University Health Sciences Center, said that bacteria common to an activated sludge plant's aeration gallery can be found in the ambient air downward from that gallery. He said pigmented tracer organisms will survive the pits and occur in ambient air downstream from that plant.

Dr. R.M. Buchan, of the Bioenvironmental engineering service of Tinker Air Force Base in Oklahoma, said that sewage treatment processes that involve spraying or agitation of sewage generate particulates with potential health significance for plant employees and people living downwind from such units. He said that the trend towards greater concentration of people in urban areas suggests an increased use of activated sludge units for treating large, continuous urban sewage flows, as well as greater exposure to potential health hazards.

In discussing the character and dewatering properties of sludge from water treatment, J.T. Novak, of the University of Missouri, said solids produced from water treatment have been poorly characterized and dewatering and disposal methods improperly selected. He said controlling sludge properties through the alteration of treatment operation variables will reduce sludge handling and disposal problems.

MONS 086054

Combination Method

A combination of biological and physical-chemical treatment methods may be necessary to reduce the pollution potential of the leachate from refuse disposal sites, according to Frederick G. Pohland, of Georgia Institute of Technology. He said recirculation of leachate throughout a landfill promotes the active anaerobic bacteria popula-