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WOOD PRESERVATIVES: A CHRONOLOGY OF REGULATORY ACTION & BIBLIOGRAPHY

DECEMBER 1985

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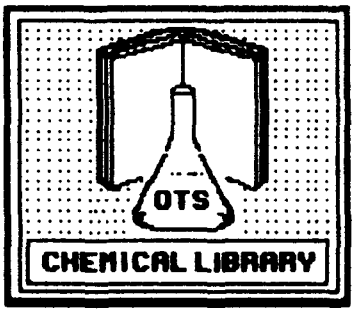

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WOOD PRESERVATIVES:
A Chronology of Regulatory Actions & Bibliography

Information has been gathered on the issue of wood preservatives to assist you in finding answers to questions on the regulatory status, restrictions on the uses of treated wood, and scientific studies and reports produced on this subject of wide public concern.

About this Bibliography

This bibliography is arranged in two sections:

- Regulatory Information including Federal Register (FR) and Code of Federal Regulations (CFR) references
- EPA funded report references

Bibliography updates will be compiled and sent to you as they become available.

Document Availability

The OTS Chemical Library staff recognizes that a bibliography is of little value if the documents it refers to are not readily available. The staff has made every effort to make all the items referenced here a part of the OTS Chemical Library Collection. To obtain a copy of any of these documents, or to make suggestions for other OTS Chemical Library subject bibliographies please contact:

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Regulatory Information

These citations from the Federal Register database refer to Federal Register (FR) notices and the Code of Federal Regulations (CFR) .

TITLE: **Federal Register Vol. 50, no. 20 p. 4269**

DATE: January 30, 1985

ABSTRACT: Notice: EPA postpones until further notice proposal (July 13, 1984, 49 FR 28666) to cancel registration for pesticide products containing creosote, pentachlorophenol & inorganic arsenicals. Effective Jan 30, 1985. Doc. No. OPP-41001A. Contact: Carol Langley (703) 557-7401.

TITLE: **Federal Register Vol. 49 No. 240 p. 48367**

DATE: December 12, 1984

ABSTRACT: Notice: EPA decides to cancel most non-wood use registrations, and to modify remaining registrations, for pesticide products containing pentachlorophenol. See issuance of RPAR (rebuttable presumption against registration) at 43 FR 48443 (Oct 18, 1978). Comment deadline Feb 11, 1985. Discussion through p. 48372. Doc. No. OPP-3000/30B. Contact: Lois Rossi (703) 557-7452.

TITLE: **Federal Register Vol. 49 No. 215 p. 44238**

DATE: November 5, 1984

ABSTRACT: Notice: EPA extends until Dec 21, 1984 the comment period on preliminary determination against registration of pesticide products containing creosote, coal tar and coal tar neutral oil for non-wood preservation uses (seen Aug 22, 1984, 49 FR 33328). Doc. No. OPP-30000/28H. Contact: Lois Rossi (703) 557-7452.

TITLE: **Federal Register Vol. 49 No. 212 p. 43772**

DATE: October 31, 1984

ABSTRACT: Notice: EPA postpones Nov 1, 1984 effective date to classify for restricted use wood preservative uses of creosote, pentachlorophenol & inorganic arsenicals (seen July 13, 1984, 49 FR 28666), and responds to questions raised by States, Indian tribes, Federal agencies and other. Effective Oct 31, 1984. Doc. No. OPP-41001.

TITLE: **Federal Register Vol. 49 No. 164 p. 33328**

DATE: August 22, 1984

ABSTRACT: Notice: EPA issues preliminary determination re risks and benefits associated with non-wood preservative uses of creosote, coal tar and car tar neutral (see Notice of rebuttable presumption against registration, or RPAR, at 43 FR 48154, Oct 18, 1978). Agency determines risks are greater than benefits, generally, and proposes to deny registration applications for listed herbicidal, fungicidal, disinfectant and repellant uses. Comment deadline Oct 22, 1984. Doc. No. OPP-30000/28G. Contact: Lois Rossi (703) 557-7452.

TITLE: **Federal Register Vol. 49 No. 136 p. 28666**

DATE: July 13, 1984

ABSTRACT: Notice: EPA notes conclusion of admin review re proposed cancellation or modification of pesticide registrations for wood preservative uses of creosote, pentachlorophenol, and inorganic arsenicals; text lists terms and conditions to be changed to prevent cancellation. Hearing requests due Aug 13, 1984. Doc. No. OPP-30000/28F; PH-FRL 2630-4. Contact: Carol Langley (703) 557-7401.

TITLE: **Federal Register Vol. 48 No. 219 p. 51684**

DATE: November 10, 1983

ABSTRACT: Notice: EPA issues analysis of risks and benefits of seven chemicals used for subterranean termite control: chlordane, heptachlor, aldrin, dieldrin, lindane, pentachlorophenol, and chlopyrifos. Comment deadline Feb 8, 1984. Doc. No. OPP-30077.

TITLE: **Federal Register Vol. 48 No. 130 p. 31081**

DATE: July 6, 1983

ABSTRACT: Notice: EPA receives pesticide product applications pursuant to FIFRA: Sumitomo Chemical America Inc for Danitol containing fenpropathrin for use on ornamental and nonbearing fruit trees, Glyco Inc, for Glycoserve, disinfectant for use as a preservative for soft detergents and soaps, same for use as a preservative for room deodorizers, soft detergents, and household coatings, and as a disinfectant, algaecide, and/or slimicide for industrial uses, Darworth Co for Darworth Copper Neoisoate, fungicide as a wood preservative, same for Darworth Zinc Neoisoate. Comment deadline Aug 5, 1983. Doc. No. OPP-30229.

TITLE: **Federal Register Vol. 48 No. 62 p. 13257**

DATE: March 30, 1983

ABSTRACT: Meeting: EPA; re wood preservatives; Apr 14, 1983, 1921 Jefferson Davis Highway, Arlington VA; agenda, Doc. No. OPP-30000.

TITLE: **Federal Register Vol. 46 No. 33 p. 13020**

DATE: February 19, 1981

ABSTRACT: Notice: EPA preliminary determination and rebuttable presumption against continued registration (RPAR) of pesticide products containing coal tar, creosote and coal tar neutral oil; pesticide products containing inorganic arsenic and pentachlorphenol used as wood preservatives. Comment deadline May 20, 1981. Doc. No. OPP-30000/28C.

TITLE: **Federal Register Vol. 46 No. 5 p. 2267**

DATE: January 10, 1981

ABSTRACT Notice: EPA denies Dow Chemical petition to remove ethylbenzene, phenol, dichlorophenol, trichlorophenol and pentachlorophenol from Clean Water Act toxic pollutants list.

TITLE: **Federal Register Vol. 45 No. 193 p. 65255**

DATE: October 2, 1980

ABSTRACT: Proposed: 16 CFR Part 13
FTC proposes consent agreement in matter of Darworth Co; to require this Avon, CT manufacturer of wood stains and wood preservative products to stop misrepresenting its products in advertisting re EPA registration. Comment deadline Dec 1, 1980. Fil No. 802 3001.

TITLE: **Federal Register Vol. 44 No. 217 p. 64555**

DATE: November 7, 1979

ABSTRACT: Notice: EPA invites comment on Dow Chemical petition to remove ethylbenzene, phenol, 2,4-dichlorophenol, 2,4,5-trichlorophenol and pentachlorophenol from toxic pollutants list pursuant to Clean Water Act. Comment deadline Jan 7, 1980.

TITLE: **Federal Register Vol. 44 No. 62 p. 18730**

DATE: March 29, 1979

ABSTRACT: Notice: EPA notifies of correction to the product search listing applicable to the rebuttable presumption against registration and continued registration of certain pesticide products containing coal tar, creosote, and coal tar neutral oil (44 FR 15771, Mar, 15 1979). Doc. No. OPP-30000.

TITLE: **Federal Register Vol. 44 No. 52 p. 15771**

DATE: March 15, 1979

ABSTRACT: Notice: EPA publishes a correction to its notice of presumption against registration and continued registration of certain products containing coal tar, creosote, and coal tar neutral oil. Rebuttal and other information must be filed by Apr 30, 1979. See product search listing which was inadvertently left out of the original notice at 43 FR 48154, Oct 18, 1978 p. 15771.

TITLE: **Federal Register Vol. 43 No. 230 p. 55819**

DATE: November 29, 1978

ABSTRACT: Meeting: EPA Science Advisory Board, Environmental Health Advisory Cmte will meet Dec 19, 1978, 9 am, 1921 Jeff Davis Hwy, Arlington VA; agenda includes formal action on study group's report on pentachlorophenol contaminants.

TITLE: **Federal Register Vol. 43 No. 225 p. 54290**

DATE: November 21, 1978

ABSTRACT: Notice: EPA extends time period for submission of rebuttable evidence and other comments on registration and continued registration of certain pesticide products containing pentachlorophenol. New deadline Feb 12, 1979. Doc. No. OPP-30000/30A. See original notice of presumption at 43 FR 48443, Oct 18, 1978.

TITLE: **Federal Register Vol. 43 No. 225 p.54289**

DATE: November 21, 1978

ABSTRACT: Notice: EPA extends time for submission of rebuttable evidence and other comments on registration and continued registration of certain pesticide products containing coal tar, creosote and coal tar neutral oils. New deadline Feb 12, 1979. All comments should bear notation OPP-30000/28A. See original notice of presumption against registration at 43 FR 48154, Oct 18, 1978.

TITLE: Federal Register Vol. 43 No. 202 p. 48154

DATE: October 18, 1978

ABSTRACT: Notice: EPA establishes a tentative schedule for completion of the rebuttable presumption against registration review of the wood-treatment uses of inorganic arsenic, pentachlorophenol, coal tar and its derivatives. Chemicals comprise the most widely used industrial pesticide wood treatment available. Comments on the comparative risks and benefits of these chemicals will assist EPA in assessing tradeoffs. Other uses for these pesticides will be considered in individual risk-benefit analyses for each chemical. Doc. No. OPP-90077. SEE ALSO notice of rebuttable presumption beginning p. 48154 and continuing thru Book 2 of today's FR. Rebuttable evidence and other information must be filed by Dec 4 1978. Publishes position documents on coal tar, creosote, and coal tar neutral oil p. 48157. See list of federally registered products containing coal tar and creosote beginning p. (MISSING DATA) presumption against registration and continued registration of pesticide products containing inorganic arsenic. Comment deadline Dec 4, 1978 p. 48267. Publishes position documents beginning p. 48270 and continuing into FR Book 2. See list of products containing inorganic arsenicals p. 48399, Book 2. Doc. No. OPP-30000/29. Notice of rebuttable presumption against pentachlorophenol and its derivatives (PCP) is published p. 48443, Book 2. Comment deadline Dec 4, 1978. Position document begins p. 48446. List of products containing PCP begins p. 48478, Doc. No. OPP-30000/30.

EPA Funded Reports

These citations from the National Technical Information Service (NTIS) database refer to EPA authored, sponsored, contracted, or otherwise funded reports.

Title Index to EPA Funded Reports

Title Index to EPA Funded Reports (cont.d)

TITLE: **Acute Toxicity of Selected Toxicants to Six Species of Fish.** (Final rept.)

AUTHOR: Cardwell, Rick D.; Foreman, Dallas G.; Payne, Thomas R.; Wilbur, Doris J.

CORPORATE SOURCE: Chemico Process Plants Co., El Monte, Calif. Envirogenics Systems.

SPONSOR: Environmental Research Lab., Duluth, Minn.

REPORT NUMBER: EPA/600/3-76/008; NTIS: PB-252 488/2

CONTRACT NUMBER: EPA-68-01-0748; EPA-ROAP-16AAE-05

NOTE: (125p)

DATE: Mar 76

ABSTRACT: The relationship between median lethal concentration and exposure time was determined for five chemicals and up to six species of freshwater fish in a flow-through system. The lowest median lethal concentrations found were 0.114 mg/l for sodium cyanide, 0.118 mg/l for sodium pentachlorophenate, 2.9 mg/l for selenium dioxide, 18.0 mg/l for sodium arsenite, 25.4 mg/l for beryllium sulfate, and greater than 100 mg/l for lead chloride. Toxicity curves relating median lethal concentration to exposure time were of three types. One curve, resembling a rectangular hyperbola, characterized the toxicity of sodium cyanide, while another curve, sigmoid in shape, characterized the toxicity of selenium dioxide. Both types of curves were observed in toxicity tests with sodium pentachlorophenate, sodium arsenite and beryllium sulfate. Linear toxicity curves were recorded for some fish species exposed to selenium dioxide, sodium arsenite and beryllium sulfate, but these were usually encountered when exposure times were less than 96 hr.

TITLE: **Ambient Water Quality Criteria: Pentachlorophenol**

AUTHOR: Environmental Protection Agency, Washington, DC. Criteria and Standards Div.

REPORT NUMBER: NTIS: PB-292 439/7

NOTE: (93p)

DATE: 1978

ABSTRACT: Section 304(a) of the Clean Water Act (33 U.S.C. 1314(a)), requires EPA to publish and periodically update water quality criteria. These criteria are to reflect the latest scientific knowledge on the identifiable effects of pollutants on public health and welfare, aquatic life, and recreation. This report presents water quality criteria for pentachlorophenol. It presents concentration criteria for the protection of freshwater and saltwater aquatic life. It presents 'safe' concentrations for humans, and in the case of suspect or proven carcinogens, gives various levels of incremental cancer risk. A section 304(a) water quality criterion is a qualitative or quantitative estimate of the concentration of a water constituent or pollutant in ambient waters which, when not exceeded, will ensure a water quality sufficient to protect a specified water use. Under the Act a criterion is a scientific entity, based solely on data and scientific judgment. It does not reflect considerations of economic or technological feasibility nor is it a water quality standard, and in itself has no regulatory effect.

TITLE: **Ambient Water Quality Criteria for Pentachlorophenol.**

AUTHOR: Environmental Protection Agency, Washington, DC. Criteria and Standards Div.

REPORT NUMBER: EPA-440/5-80-065; NTIS: PB81-117764

NOTE: CAS Registry No.: 87-86-5

DATE: Oct 80 (98p)

ABSTRACT: Section 304(a) of the Clean Water Act (33 U.S.C. 1314(a)), requires EPA to publish and periodically update water quality criteria. These criteria are to reflect the latest scientific knowledge on the identifiable effects of pollutants on public health and welfare, aquatic life, and recreation. This report presents water quality criteria for the titled chemical. It presents

concentration criteria for the protection of freshwater and saltwater aquatic life. It presents 'safe' concentrations for humans, and in the case of suspect or proven carcinogens, gives various levels of incremental cancer risk. A section 304(a) water quality criterion is a qualitative or quantitative estimate of the concentration of a water constituent or pollutant in ambient waters which, when not exceeded, will ensure a water quality sufficient to protect a specified water use. Under the Act a criterion is a scientific entity, based solely on data and scientific judgment. It does not reflect considerations of economic or technological feasibility nor is it a water quality standard, and in itself has no regulatory effect.

TITLE: **An Intralaboratory Comparative Study of Hydride Generation and Graphite Furnace Atomic Absorption Techniques for Determining Organic and Inorganic Arsenic in Complex Wastewaters.** (Journal article)

AUTHOR: Kinard, James T.; Gales, Jr, Morris.

CORPORATE SOURCE: Benedict Coll., Columbia, SC.

SPONSOR: Environmental Monitoring and Support Lab.-Cincinnati, OH.

REPORT NUMBER: EPA-600/J-81-349; NTIS: PB82-128216

CONTRACT NUMBER: EPA-R-805237

NOTES: Pub. in Jnl. of Environmental Sci. Health A16(1), p27-50 1981. (25p)

DATE: 1981

ABSTRACT: A detailed intralaboratory comparison of the determination of arsenic in complex wastewater samples by hydride generation and graphite furnace atomic absorption techniques has been conducted. Two hydride generation techniques were employed. One consisted of the use of sodium borohydride pellets and argon to sweep the arsin into a hydrogen flame. In the second, arsine was produced from a sodium borohydride solution and swept into an air-acetylene heated quartz tube. The hydride generation techniques yielded

consistent, reliable data for highly complex wastewater matrices only when arsine generation was preceded by a close acid digestion procedure. Complete recovery of arsenic (99%) was achieved using the graphite furnace technique and was found to be independent of the complexity of the wastewater matrix and of the organic form of arsenic present. Hydride generation and graphite furnace atomic absorption techniques were comparable with regard to sensitivity, reproducibility and relative detection limits. The latter was somewhat superior in terms of accuracy and the need for sample pretreatment. Both types of techniques are suitable for routine analysis.

TITLE: **Biodegradation and Photolysis of Pentachlorophenol in Artificial Freshwater Streams.**

AUTHOR: Pignatello, J.J.; Martinson, M.M.; Steifert, J.G.; Carlson, R.E.; Crawford, R.L.,

CORPORATE SOURCE: Saint Olaf Coll., Northfield, MN.

SPONSOR: Environmental Research Lab.-Duluth, MN.

REPORT NUMBER: EPA-600/J-83-162; NTIS: PB84-170927

CONTRACT NUMBER: EPA-R-810016

NOTES: Pub. in Applied Environmental Microbiology v46, n5 p1024-1031 1983. (11p)

DATE: c1983

ABSTRACT: The biodegradation, photolysis, and adsorption of pentachlorophenol (PCP) in outdoor, aquatic environments were examined with man-made channels built by the U.S. Environmental Protection Agency at a field station on the Mississippi River near Monticello, Minn. The authors monitored the biotic and abiotic degradation of PCP in these channels for approximately 16 weeks. Most of the PCP-mineralizing microorganisms that developed in the channels were either attached to surfaces (e.g., rocks and macrophytes) or associated with surface sediments. Total bacterial numbers (direct microscopic counts) in the various channels were not affected significantly by PCP

concentrations of micrograms per liter. Numerous strains of bacteria able to grow at the expense of PCP were isolated from the adapted channels. The experiments reported here will help predict the responses of flowing aquatic ecosystems to contamination by biocides such as pentachlorophenol.

TITLE: **Chlorodibenzo-p-dioxin Contamination of Two Commercially Available Pentachlorophenols.**

AUTHOR: Villanueva, Ellen C.; Burse, Virlyn W.; Jennings, Ralph W.

SPONSOR: Environmental Protection Agency, Perrine, Fla. Primate and Pesticides Effects Lab.

REPORT NUMBER: NTIS: PB-280 096/9.

NOTES: Pub. in Agricultural and Food Chemistry, v21 n4 p739-740 Jul/Aug 73. Included in the report, Journal Articles on Toxicology. Group 10, PB-280 085 (4p)

DATE: 5 Mar 73

ABSTRACT: A comparison was made of chlorodibenzo-p-dioxin contamination in a technical and an analytical grade of commercially available pentachlorophenols. Hexa-, hepta-, and octachlorodibenzo-p-dioxin were found in both samples. The technical product was more contaminated than the analytical one by factors of 1400, 600, and 539 for the hexa-, hepta-, and octachlorodibenzo-p-dioxin, respectively. Tetrachlordibenzo-p-dioxin was not found. Results were determined by gas chromatography and confirmed by infrared spectrophotometry and mass spectrometry. Mass spectral analysis indicated the presence of polychlorodibenzofurans and polychlorodiphenyl ethers. A distinction was made, using gas chromatography-mass spectrometry, between the chlorobenzofurans observed as original constituents of the pentachlorophenol and those derived from the fragmentation of chlorodiphenyl ethers.

TITLE: **Chronic Toxicity of Chlordane, Trifluralin, Pentachlorophenol to Sheepshead Minnows (Cyprinodon variegatus).** (Final rept.)

AUTHOR: Parrish, Patrick R.; Dyar, Elizabeth E.; Enos, Joanna M.; Wilson, William G.

CORPORATE SOURCE: EG and G, Bionomics, Pensacola, Fla. Marine Research Lab.

SPONSOR: Environmental Research Lab., Gulf Breeze, Fla.

REPORT NUMBER: BP-78-1-006; EPA/600/3-78/010; NTIS: PB-278-269/6

CONTRACT NUMBER: EPA-68-03-2069

NOTES: (67p)

DATE: Jan 78

ABSTRACT: Sheepshead minnows (Cyprinodon variegatus) were exposed to three chemicals--chlordane, trifluralin, or pentachlorophenol---in flowing, natural seawater to determine acute and chronic (full life-cycle effects). Mortality of parental fish exposed to mean measured chlordane concentrations > or - 2.8 micrograms/l was significantly greater than that of control fish. Hatch of juveniles from embryos of parental fish exposed to > or - 0.8 micrograms/l was significantly less than hatch of control juveniles. The estimated maximum acceptable toxicant concentration (MATC) was >0.5<0.8 micrograms/l and the application factor (AF) limits, 0.04-0.06. Exposure to mean measured trifluralin concentrations > or - 9.6 micrograms/l significantly decreased growth of parental fish. Fecundity of parental fish exposed to concentrations > or - 4.8 micrograms/l was significantly less than that of control fish. Survival and growth of second generation fish were significantly less than the control in concentrations > or - 9.6 micrograms/l. The estimated MATC was >1.3<4.8 micrograms/l and the AF limits, 0.007-0.025. Mortality of parental sheepshead minnows exposed to mean measured pentachlorophenol concentrations >88 micrograms/l was significantly greater than mortality of control fish. The estimated MATC was >47<88 micrograms/l and the AF limits, 0.11-0.20.

TITLE: **Coal Tar, Creosote, and Coal Tar Neutral Oil: Position Document 1**

AUTHOR: Environmental Protection Agency, Arlington, VA. Special Pesticide Review Div.

REPORT NUMBER: EPA/SPRD-80/82; NTIS: PB80-213879

NOTES: (122p)

DATE: 18 Oct 78

ABSTRACT: Examination of possible unreasonable risks associated with uses of pesticide and a gathering of all available information to determine whether or not this or any other risk does exist are covered.

TITLE: **Controlled Air Incineration of Pentachlorophenol-Treated Wood**

AUTHOR: Stretz, L.A.; Vavruska, J.S.

CORPORATE SOURCE: Los Alamos National Lab., NM.

SPONSOR: Industrial Environmental Research Lab.-Cincinnati, OH.; Defense Property Disposal Service, Battle Creek, MI.

REPORT NUMBER: EPA-600/2-84-089; NTIS: PB84-189851

NOTES: Sponsored in part by Defense Property Disposal Service, Battle Creek, MI. (110p)

DATE: May 84

ABSTRACT: This research was initiated to determine the operating conditions necessary to effect complete thermal destruction (greater than 99.99%) of pentachlorophenol (PCP)-treated wood in a controlled air incinerator (CAI) and to provide a basis for evaluating the applicability of other incineration systems to the destruction of PCP-treated wood. The treated wood in question was scrap from used ammunition crates in Korea. It has been proposed that a substantial amount of such wood be disposed of by incineration in a unit located in that country. A major concern in such incineration is the potential formation of such toxic compounds as chlorinated dibenzo-p-dioxins and dibenzofurans. Test results showed a combustion efficiency of

>99.99% for PCP in the primary chamber under test conditions with no detectable production of tetrachlorodibenzo-p-dioxin (TCDD) or tetrachlorodibenzofuran (TCDF) at detection limits in sample extracts of 1 and 5 ppb, respectively.

TITLE: **Degradation of Pentachlorophenol and Pentachloronitrobenzene in a Laboratory Compositing System.**

AUTHOR: Sikora, L.J.; Kaufman, D.D.; Ramirez, M.A.; Willson, G.B.

CORPORATE SOURCE: Agricultural Research Service, Beltsville, MD.

SPONSOR: Municipal Environmental Research Lab., Cincinnati, OH.

REPORT NUMBER: NTIS: PB82-173287

NOTES: Sponsored in part by Municipal Environmental Research Lab., Cincinnati, OH. Prepared in cooperation with Maryland Environmental Service, Annapolis.
Included in Land Disposal of Hazardous Waste, p372-382

DATE: 1982.

ABSTRACT: No abstract available.

TITLE: **Determination of Pentachlorophenol in Blood, Urine, Tissue, and Clothing.**

AUTHOR: Barthel, W.F.; Curley, August; Thrasher, C.L.; Sedlak, V.A.; Armstrong, Robert

SPONSOR: National Communicable Disease Center, Atlanta, Ga.

REPORT NUMBER: NTIS: PB-276 899/2

NOTES: Pub. in Jnl. of the Association of Official Analytical Chemists, v52 n2 p294-298, Mar 69. Included in the report, Journal Articles on Pesticide Chemical Analysis. Group 5, PB-276 897. (6p)

DATE: 4 Sep 68

ABSTRACT: An epidemic with two deaths occurred in a nursery in St. Louis after the use of pentachlorophenol as a mildew preventive with the laundry detergent. Samples of blood, urine, tissue, and clothing from the nursery were extracted with ethyl ether. The ether solution was extracted with 5% sodium hydroxide; the basic solution was acidified and then extracted with benzene. The benzene solution was analyzed by electron capture gas chromatography, using a 3% diethylene glycol succinate column with 2% sirupy phosphoric acid on 60-80 mesh Chromosorb G. Pentachlorphenol was found in the samples in sufficient quantity to account for the epidemic. The presence of pentachlorophenol was confirmed by gas chromatography-mass spectroscopy and by thin layer analysis.

TITLE: **The Determination of Pentachlorophenol and Hexachlorophene in Human Adipose Tissue.**

AUTHOR: Shafik, T.M.

CORPORATE SOURCE: Perrine Primate Lab.

SPONSOR: Environmental Protection Agency, Perrine, Fla.

REPORT NUMBER: NTIS: PB-278 083/1

NOTES: Pub. in Bulletin of Environmental Contamination and Toxicology, v10 n1 p57-63 1973.
Included in the report, Journal Articles on Toxicology Group 3, PB-278 081. (7p)

DATE: 1973

ABSTRACT: The identification and quantitation of potential chemical pollutants and their metabolites in human adipose tissue are of great importance for monitoring human exposure to these environmental compounds. The two highly chlorinated phenols, pentachlorophenol (PCP) and hexachlorophene (2,2-methylenebis 3,4,6,-trichlorophenol)) (HCP), are widely used, and the article establishes the extent of their storage in human adipose tissue.

TITLE: **Determination of Pentachlorophenol and Hexachlorobenzene Residues.** (Final rept. Jan-Jul 80)

AUTHOR: Lakings, Duane B.; Subra, Wilma; Going, John

CORPORATE SOURCE: Midwest Research Inst., Kansas City, MO.

SPONSOR: Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.

REPORT NUMBER: EPA-560/13-80-030; NTIS: PB80-222672

CONTRACT NUMBER: EPA-68-01-5915; MRI-4901-A12

NOTES: Prepared in cooperation with Gulf South Research Inst., New Orleans, LA. (99p)

DATE: Jun 80

ABSTRACT: An evaluation of possible exposure to pentachlorophenol (PCP) by residents in Madison County, Kentucky, who had obtained ammunition crate wood treated with PCP from the Blue Grass Army Depot was conducted. Serum and unconjugated urine levels of PCP were determined in 51 test cases and 47 control individuals and in 7 special cases (residents of log homes treated with PCP). In addition, air, food product, and wood samples collected at the residences were analyzed for PCP residues. The results showed similar PCP levels in the serum and urine of the test cases and control individuals. No PCP was detected in the air collected from these groups' residences; and the levels of PCP exposure from the ammunition crate wood. However, high PCP levels were found in the serum and urine of the special cases, particularly three young children who had PCP serum levels above 1,000 ppb (40 times the control individual average). Air and wood samples from a special case residence also contained PCP. Thus, the special cases were being subjected to PCP exposure and additional studies on log home residences are recommended to define the exposure level and the possible adverse health effects. No hexachlorobenzene was found in any samples.

TITLE: **Determination of Pentachlorophenol in Marine Biota and Sea Water by Gas-Liquid Chromatography and High-Pressure Liquid Chromatography.** (Journal article)

AUTHOR: Faas, Linda F.; Moore, James C.

SPONSOR: Environmental Research Lab., Gulf Breeze, FL.

REPORT NUMBER: EPA-600/J-79-053; NTIS: PB80-163678

NOTES: Pub. in Journal of Agricultural and Food Chemistry, v27, n3, p554-557, Jun 79. (5p)

DATE: Jun 79

ABSTRACT: A method is described for measuring pentachlorophenol (PCP) in samples from the estuarine environment. Gas-liquid chromatography (GLC) is used to determine PCP residues in tissues as low as 0.01 ppm by formation of the ethyl diazohydrocarbon derivative, followed by Florisil cleanup. Application of the method to exposed organisms indicates that PCP accumulates in mullet (Mugil cephalus), grass shrimp (Palaemonetes pugio), and eastern oysters (Crassostrea virginica). Sea water concentrations as low as 0.002 ppb may be detected by formation of the amyl diazohydrocarbon derivative. Formation of the amyl derivatives of PCP and several related compounds gives GLC separation not possible with the methyl or ethyl derivatives. Parameters are outlined for high-pressure liquid chromatography (LC) determination of the free phenol without cleanup. Ultraviolet detection limits for PCP by LC are 5.0 ppm in tissues and 2.0 ppb in seawater.

TITLE: **Determination of Pentachlorophenol in Urine: The Importance of Hydrolysis.** (Journal article)

AUTHOR: Edgerton, Thomas R.; Moseman, R.F.

SPONSOR: Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.

REPORT NUMBER: EPA/600/J-79/009; NTIS: PB-294 920/4

NOTES: Pub. in Jnl. of Agriculture and Food Chemistry, v27 n1 p197-199 1979. (5p)

DATE: 4 May 78

ABSTRACT: A gas chromatographic method for more reliable determination of pentachlorophenol (PCP) in urine has been developed. After hydrolysis and extraction the sample was reacted with diazomethane to produce the methyl ether of PCP prior to analysis by electron-capture gas chromatography. An acid alumina column clean-up system was developed to remove interferences from the sample extracts and allow detectability of 1 ppb PCP. Average recoveries of greater than 90% were obtained from urine fortified with known amounts of PCP. The importance of hydrolysis and comparisons of present methodologies will also be presented.

TITLE: **Development Document for Effluent Limitations Guidelines New Source Performance Standards and Pretreatment Standards for the Timber Products Processing Point Source Category.** (Final rept.)

AUTHOR: Williams, Richard

SPONSOR: Environmental Protection Agency, Washington, DC. Effluent Guidelines Div.

REPORT NUMBER: EPA-440/1-81/023; NTIS: PB81-227282

NOTES: (522p)

DATE: Jan 81

ABSTRACT: This document presents the findways of a study of the wood preserving, insulation board, and not process hardboard segments of the Timber Products Processing point source category for the purpose of developing effluent limitations and guidelines for existing point source standards of performance and pretreatment standards for new and existing point sources as mandated by the Clean Water Act (P. L. 95 - 217). The information presented in this document supports regulations promulgated in January 1981 for the Timber Products Processing Point Source Category. Prescriptions of the treatment technologies appropriate for

achieving the limitations are contained within this document, as well as supporting data, costs estimates and rationale for the development of the proposed effluent limitations, guidelines, and standards of performance.

TITLE: **Dioxins. Volume II. Analytical Method for Industrial Wastes.** (Final rept. Oct 78-Mar 79)

AUTHOR: Tiernan, T.O.; Taylor, M.L.; Erk, S.D.; Solch, J.G.; Van Ness, G.

CORPORATE SOURCE: PEDCo-Environmental, Inc., Cincinnati, OH.

SPONSOR: Industrial Environmental Research Lab.-Cincinnati, OH. Industrial Pollution Control Div.

REPORT NUMBER: EPA-600/2-80-157; NTIS: PB80-220080

NOTES: See also Volume 1, and Volume 3. (80p)

DATE: Jun 80

ABSTRACT: The overall objective of this research project was to develop a unified analytical approach for use in quantifying ppt levels of tetrachlorodibenzo-p-dioxins (TCDD's) in various chemical wastes. Waste samples from plants manufacturing trichlorophenol, pentachlorophenol, and hexachlorophene, and from processing wood preservatives were provided by the EPA. The extraction procedure developed for isolating the TCDD's from the various types of sample matrices is fully described. Analysis was accomplished using highly specific and sensitive coupled gas chromatographic-mass spectrometric (GC-MS) methods. Both low and high resolution MS techniques were employed. This methodology is also described in detail. The procedures presented in this report were acceptable for most of the industrial process samples provided.

TITLE: **Economic Impact Analysis of Alternative Pollution Control Technologies, Wood Preserving Subcategories of the Timber Products Industry.** (Technical rept. (Final))

AUTHOR: Little (Arthur D.), Inc., Cambridge, MA.

SPONSOR: Environmental Protection Agency, Washington, DC. Office of Water Planning and Standards.

REPORT NUMBER: EPA-440/2-80-087; NTIS: PB81-205825

CONTRACT NUMBER: EPA-68-01-4194

NOTES: (162p)

DATE: Jan 81

ABSTRACT: The report includes an industry characterization (processes, market structure and financial information), industry costs of compliance with the effluent limitations and an economic impact analysis for existing and new sources resulting from the effluent limitations for the Wood Preserving Industry. Wood treating processes include pressure and non-pressure systems. The two pressure processes used are Boulton or Steam processes.

TITLE: **Effect of Pentachlorophenol on the Growth and Mortality of Embryonic and Juvenile Steelhead Trout.**

AUTHOR: Dominguez, S.E.; Chapman, G.A.

SPONSOR: Corvallis Environmental Research Lab., OR.

REPORT NUMBER: EPA/600/J-84/183; NTIS: PB85-144129/XAB

NOTES: Pub. in Archive of Environmental Contamination and Toxicology 13, p739-743 Nov. 84. (7p)

DATE: 1984

ABSTRACT: The toxicity of sodium pentachlorophenate to early life stages of steelhead trout (Salmo gairdneri) was investigated, using a flow-through exposure system. A 96-hr LC50 of 66 micrograms/l was derived for previously unexposed ten-week-old fry. A 72-day test, beginning 24 hr after fertilization, yielded a chronic toxicity threshold of 14 micrograms/l. These results, and the acute/chronic ration of 4.7, compare reasonably well with values in the literature. Yolk sac edema and cranial malformations, which are commonly observed in chronic tests with technical grade

pentachlorophenol, were rated in this test with purified (99%) material.

TITLE: **Effects of Pentachlorophenol on Development of Estuarine Communities.** (Final journal article)

AUTHOR: Tagatz, Marlin E,; Ivey, Joel M.; Tobia, Michael

SPONSOR: Environmental Research Lab., Gulf Breeze, Fla.

REPORT NUMBER: EPA/600/J-77/069; CONTRIB-310; NTIS: PB-277 154/1

NOTES: Pub. in Jnl. of Toxicology and Environmental Health, v3 p501-506 1977. (6p)

DATE: 3 May 77

ABSTRACT: Pentaclorophenol affected the composition of communities of estuarine organisms developed in sand from planktonic larvae in estuarine water that flowed through ten control aquaria and ten aquaria per exposure concentration averaging 7, 76, or 622 micrograms/liter. Annelids, arthropods, and mollusks were the numerically dominant phyla when animals were collected in a 1-mm-mesh sieve after 9 wk of exposure. Mollusks were markedly fewer at 7 micrograms/liter; annelids and arthropods at 76 micrograms/liter. Almost no animals occurred at 622 micrograms/liter. The total numbers of individuals and species were significantly less (alpha = 0.01) in aquaria exposed to 76 micrograms/liter than in those unexposed or exposed to micrograms/liter. (Copyright (c) 1977 by Journal of Toxicology and Environmental Health.)

TITLE: **The Effect of Technical and Purified Pentachlorophenol on the Rat Liver.** (Journal article)

AUTHOR: Kimbrough, Renate D.; Linder, Ralph E.

SPONSOR: Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.

REPORT NUMBER: EPA-600/J-78-163; NTIS: PB80-130321

NOTES: Pub. in Toxicology and Applied Pharmacology 46, p151-162 1978. (14p)

DATE: 17 Nov. 77

ABSTRACT: Dietary concentrations of 0, 20, 100, and 500 ppm of technical grade pentachlorophenol were fed to male and female Sherman strain rats for 8 months. The same experiment using purified pentachlorophenol was carried out. The food consumption was measured in all rats during the second week of exposure and for one week every 6 weeks thereafter. An autopsy was performed on all rats at the end of the experiment. The brain, lungs, spleen, liver, kidneys, heart, and testes were weighed and examined grossly and microscopically in all rats fed purified pentachlorophenol, all female rats fed technical pentachlorophenol, and in the male rats fed the highest dose of technical pentachlorophenol and the controls. Only the kidneys and livers were examined microscopically in the male rats fed 20 and 100 ppm of technical pentachlorophenol. Although the food intake was comparable, male and female rats fed 500 ppm of technical and male rats fed 500 ppm of purified pentachlorophenol gained less weight. The livers of the male and female rats fed 500 ppm technical pentachlorophenol weighed significantly more than those of the controls. The kidneys of all male rats fed purified pentachlorophenol weighed significantly more than those of the controls; however, there was no dose-related increase. No morphological changes were seen in the kidneys. At the 500-ppm dietary concentrations, technical pentachlorophenol produced a severe effect in the liver of female rats characterized by vacuolation of the hepatocytes, an increase in fibroblasts and other mononuclear cells within sinusoids, bile duct proliferation, periportal fibrosis, degenerated liver cells, increased mitotic figures, and an accumulation of brown pigment in macrophages and in Kupffer cells. In male rats at the 100- or 500-ppm dietary concentrations of technical pentachlorophenol, the predominant lesion consisted of enlarged pleomorphic hepatocytes which had foamy cytoplasm or cytoplasm with large

vacuoles. The walls of the hepatic central veins of the livers in animals of both sexes were thickened. At the 100-ppm dietary concentrations similar but less pronounced effects were observed in the livers. Only mild alterations were noted at the 20-ppm dietary concentration. Purified pentachlorophenol caused slightly enlarged liver cells with occasional eosinophilic cytoplasmic inclusions at 500 ppm but no alterations were observed in the livers of rats fed the 100- and 20-ppm dietary concentrations. The results suggest that most of the toxicity associated with feeding technical grade pentachlorophenol to rats at these dietary concentrations stems from toxic contaminants rather than from pentachlorophenol.

TITLE: **Effects of a Hexachlorobiphenyl and Pentachlorophenol on Growth and Photosynthesis of Phytoplankton.** (Journal article)

AUTHOR: Gotham, I.J.; Rhee, G-Y.
New York State Dept. of Health, Albany. Environmental Health Inst.

SPONSOR: Environmental Research Lab.-Duluth, MN.

REPORT NUMBER: EPA-600/J-82-367; NTIS: PB84-110261

CONTRACT NUMBER: EPA-R-806126

NOTES: Pub. in Jnl. of Great Lakes Research, v8 n2 p328-335 1982. (11p)

DATE: c1982

ABSTRACT: The effects of two organochlorine compounds 2,4,5,2',4',5',-hexachlorobiphenyl (HCB) and pentachlorophenol (PCP) on photosynthesis and growth were investigated in semicontinuous cultures of three species of algae: Ankistrodesmus falcatus, Melosira sp., and Microcystis sp.

TITLE: **Effects of Pentachlorophenol on Field-and Laboratory-Developed Estuarine Benthic Communities.** (Journal article)

AUTHOR: Tagatz, M.E.; Ivey, J.M.; Gregory, N.R.; Oglesby, J.L.

SPONSOR: Environmental Research Lab., Gulf Breeze, FL.

REPORT NUMBER: EPA-600/J-80-126; ERL.GB-J081; NTIS: PB81-197378

NOTES: Pub. in Bulletin of Environmental Contamination and Toxicology 26, p137-143 1981. (9p)

DATE: 1981

ABSTRACT: A study of the response of benthic communities exposed to pentachlorophenol (PCP) was conducted to obtain additional information on the effects of this widely used chemical on the estuarine environment and to compare its effect on estuarine benthic communities developed in the field and in the laboratory. PCP is used as a wood preservative, an insecticide, a fungicide and a bactericide, and has been shown to be toxic to many aquatic organisms. In the present study, already established communities were challenged with PCP.

TITLE: **Effects of Pentachlorophenol on Hepatic Drug-Metabolizing Enzymes and Porphyria Related to Contamination with Chlorinated Dibenzo-p-Dioxins and Dibenzofurans.** (Journal article)

AUTHOR: Goldstein, Joyce A.; Friesen, Marlin; Linder, Ralph E.; Hickman, Patricia; Hass, J. Ronald

SPONSOR: Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.

REPORT NUMBER: EPA-600/J-77-171, NTIS: PB80-129976

NOTES: Pub. in Biochemical Pharmacology, v26 p1549-1557, 1977. (11p)

DATE: 12 May 76

ABSTRACT: The hepatic effects of technical and pure grade pentachlorophenol were investigated in

female rats fed 20, 100 and 500 ppm of each for 8 months. Technical pentachlorophenol was contaminated with 8 ppm hexa-, 520 ppm hepta-, and 1380 ppm octachloro-dibenzodioxins; pure pentachlorophenol contained less than 0.1 ppm of each of these contaminants. Technical pentachlorophenol produced hepatic porphyria and increased hepatic aryl hydrocarbon hydroxylase activity, glucuronyl transferase activity, liver weight, cytochrome P-450 and microsomal heme, but not N-demethylase activity. The peak of the CO-difference spectrum of cytochrome P-450 was shifted to 448 nm, and there was a dramatic increase in the 455-430 ratios of the ethyl isocyanide difference spectrum. The enzyme changes were observed at 20 ppm of technical pentachlorophenol. Porphyria occurred at 100 and 500 ppm. Pure pentachlorophenol had no significant effect on aryl hydrocarbon hydroxylase activity, liver weight, cytochrome P-450, microsomal heme, the ethyl isocyanide difference spectrum or N-demethylase activity at any dose level, but did increase glucuronyl transferase at 500 ppm. In contrast, both pure and technical pentachlorophenol decreased body weight gain comparably at 500 ppm. It is concluded that technical pentachlorophenol produces a number of liver changes which cannot be attributed to pentachlorophenol itself, but are consistent with the effects of biologically active chlorinated dibenzo-p-dioxins and dibenzofurans.

TITLE: **Effects of Phenol, 2,4-Dimethylphenol, 2,4-Dichlorophenol, and Pentachlorophenol on Embryo, Larval, and Early-Juvenile Fathead Minnows ('Pimephales promelas').** (Journal article)

AUTHOR: Holcombe, Gary W.; Phipps, Gary L.; Fiandt, James T.

SPONSOR: Environmental Research Lab. -Duluth, MN.

REPORT NUMBER: EPA-600/J-82-159; NTIS: PB82-207887

NOTES: Pub. in Arch. Environm. Contam. Toxicol. 11, p73-78, 1982. (8p)

DATE: 1982

ABSTRACT: Embryos of fathead minnows were more resistant to phenol, 2,4-dimethylphenol (2,4-DMP), 2,4-dichlorophenol (2,4-DCP), and pentachlorophenol (PCP) than were larval or juvenile life stages. Growth of 28-day-old fish was the most sensitive indicator of stress during exposures to phenol, 2,4-DMP, and PCP, whereas survival was the most sensitive indicator of toxic effects from 2,4-DCP exposure. Based on these effects, the estimated maximum acceptable toxicant concentration for fathead minnows in Lake Superior water lies between 1,830 and 3,570 micrograms/L for phenol; 1,970 and 3,110 micrograms/L for 2,4-DMP; 290 and 460 micrograms/L for 2,4-DCP; and 44.9 and 73.0 micrograms/L for PCP.

TITLE: **Effects of Transplacental Exposure to Chlorinated Phenols.** (Journal article)

AUTHOR: Exon, Jerry H.; Koller, Loren D.

CORPORATE SOURCE: Idaho Univ., Moscow

SPONSOR: Health Effects Research Lab., Research Triangle Park, NC.

REPORT NUMBER: EPA-600/J-81-373; NTIS: PB83-187914

CONTRACT NUMBER: EPA-R-807267

NOTES: Pub. in Environmental Health Perspectives, v46 p137-140 1982. (6p)

DATE: 1982

ABSTRACT: Female rats were exposed to 0,5,50 or 500 ppm of 2-Chlorophenol (2CP) or pentachlorophenol (PCP). The study was designed to produce progeny which were exposed to the chlorophenolic compounds both prenatally and postnatally. Percent conception, litter size, birth weight, and number of stillbirths was determined at parturition. Hematologic parameters and body weights of the progeny were recorded at weaning age (3 weeks). Effects on reproduction were observed in both the 2-CP and PCP-exposed groups, as indicated by decreased litter sizes and increased number of stillborn. The data indicate that these chlorinated phenolic compounds may be feto- or embryotoxic at high doses. Effects

on hematologic parameters were not observed. Further study involving transplacental and chronic exposure to these chlorophenolic compounds appears warranted.

TITLE: **Epidemiological Notes and Reports: Pentachlorophenol Poisoning in Newborn Infants.**

CORPORATE SOURCE: National Communicable Disease Center, Atlanta, Ga.

REPORT NUMBER: NTIS: PB-276 321/7

NOTES: Pub. in Morbidity and Mortality Weekly Report, v16 n40 p334-335 n.d. Included in the report, Journal Articles on Chemical Residues in Man, PB-276-320 (2p)

DATE: 1967

ABSTRACT: From April to August 1967, nine cases of a clinically distinct illness characterized by fever and profuse sweating occurred in a small nursery for newborns in St. Louis, Missouri. Two of the cases were fatal. Only after the ninth case developed was it discovered that an antimildew agent, containing a high concentration of sodium pentachlorophenate (the sodium salt of pentachlorophenol), was being used in the hospital laundry. All of the clinical, epidemiological, and biochemical evidence indicated that this outbreak resulted from pentachlorophenol poisoning. The only identified mode of exposure was skin absorption of sodium pentachlorophenate residues on diapers and other fabrics, resulting from the misuse of the antimildew agent in the final laundry rinse.

TITLE: **Fate and Effects of Pentachlorophenol in Hard- and Soft-Water Microcosms.** (Journal article)

AUTHOR: Brockway, D.L.; Smith, P.D.; Stancil, F.E.

SPONSOR: Environmental Research Lab., Athens, GA.

REPORT NUMBER: EPA/600/J-84/229; NTIS: PB85-160430/XAB

NOTES: Pub. in Chemosphere 13, n12 p1363-1377. (17p)

DATE: 1984

ABSTRACT: The influence of hard water and soft water on the fate and effects of pentachlorophenol (PCP) was investigated in small microcosms. Minor differences in the fate of PCP and minor changes in microcosm structure were noted between the hard-and soft-water systems. Definite differences between hard-water and soft-water systems were detected in dissolved oxygen production and dissolved silica concentration at an exposure concentration of 4 mg 1/1 PCP.

TITLE: **Fate and Impact of Pentachlorophenol in a Freshwater Ecosystem.** (Final rept. Jul 75-Nov 77)

AUTHOR: Pierce, Jr, Richard H.

CORPORATE SOURCE: University of Southern Mississippi, Hattiesburg. Inst. of Environmental Science.

SPONSOR: Environmental Research Lab., Athens, GA.

REPORT NUMBER: EPA/600/3-78/063; NTIS: PB-286 830/5

CONTRACT NUMBER: EPA-R-803820

NOTES: (74p)

DATE: Jul 78

ABSTRACT: The investigation was undertaken to determine the fate of pentachlorophenol (PCP) that caused extensive fish kills in a freshwater lake in December 1974 and again in December 1976. The kills resulted from the accidental release of wood-treating wastes containing PCP in fuel oil. Food chain relationships were investigated in the lake and the accumulation and elimination of sublethal concentrations of dissolved PCP was studied under laboratory conditions for the bluegill (Lepomis macrochirus). The highest concentrations of PCP in fish were observed in the bile followed by liver, gills, and muscle. Lake sediment and leaf litter contained high concentrations of PCP throughout the two-year study. Studies of leaf litter from the contaminated water shed

area showed it to be source for chronic pollution of the aquatic ecosystem.

TITLE: **Fate and Impact of Wood Preservatives in a Terrestrial Microcosm.** (Journal article)

AUTHOR: Gile, Jay D.; Collins, James C.; Gillett, James W.

SPONSOR: Corvallis Environmental Research Lab., OR.

REPORT NUMBER: EPA-600/J-82-218; NTIS: PB82-261363

NOTES: Pub. in Jnl. of Agricultural and Food Chemistry, v30 n2 p295-210 Mar-Apr 82. (9p)

DATE: 6 Dec 81

ABSTRACT: The transport and effects of 14C-labeled wood preservatives (creosote with labeled phenanthrene or acenaphthene, pentachlorophenol, and bis(tri-n-butyltin)oxide) impregnated in wood posts were examined in a terrestrial microcosm chamber (TMC-II) in comparison to a reference compound, the insecticide dieldrin. The TMC-II contained a Willamette Valley topsoil, ryegrass, invertebrates, and a gravid gray-tailed vole (Microtus canicaudus). Approximately 2.5 months after introduction of the posts, 95% of the chemicals remained in the posts. Of the material released into the ecosystem, most remained in the upper soil layer immediately surrounding the posts. Concentrations in plants ranged from 0.7 ppm for dieldrin to 8.8 ppm for phenanthrene. Residue accumulation by the invertebrates was highly variable. Of the chemicals tested, creosote accumulated in the vole to the greatest extent (e.g., whole body concentrations of 7.2 and 37.0 ppm for phenanthrene and acenaphthene, respectively). Only dieldrin exhibited any acute toxic effects (e.g., cricket survival).

TITLE: **Gas Chromatographic Analysis of Pentachlorophenol in Human Urine by Formation of Alkyl Ethers.**

AUTHOR: Cranmer, Morris; Freal, Joseph

CORPORATE SOURCE: Environmental Protection Agency, Perrine, Fla. Perrine Primate Lab.

REPORT NUMBER: NTIS: PB-280 882/2

NOTES: Pub. in Life Sciences, v9 p121-128 1970. Included in the report. Journal Articles on Toxicology, Group 15, PB-280 879. (9p)

DATE: 18 Sep 69

ABSTRACT: Pentachlorophenol (PCP) is an herbicide, defoliant, and antimicrobic chemical used throughout the United States as a preservative agent for many products. Pentachlorophenol seems to be present everywhere, appearing in municipal water supplies, wells, paints, wood and paper products, and in urine of every person now being examined. The ubiquity of human exposure to this potentially dangerous compound has prompted concern in the field of public health. This interest has been stimulated by several recent industrial and public intoxications which resulted in fatalities. This report describes a simple and rapid method for the determination of PCP based upon its conversion to any one or more of seven possible alkyl ethers. PCP ethers are detected and quantitated by electron capture gas chromatography and their identity is confirmed by p-values. Data are presented for seven GLC columns and three p-value solvent systems.

TITLE: **Health Assessment Document for Inorganic Arsenic. External Review Draft.** (Draft rept.)

AUTHOR: Mushak, Paul; Piscator, Magnus; Sivulka, Donna J.

SPONSOR: Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.

REPORT NUMBER: EPA-600/3-83-021A; NTIS: PB83-232306

NOTES: (308p)

DATE: Jun 83

ABSTRACT: This document summarizes current scientific information regarding the effects of

inorganic arsenic on man and the environment. The observed effects, as presented herein, constitute the health basis from which the U.S. Environmental Protection Agency will make determinations regarding regulatory initiatives pursuant to the Clean Air Act. Specifically, this document discusses the following topics--physical and chemical properties of inorganic arsenic; environmental distribution and cycling; inorganic arsenic metabolism, toxicology and essentiality--and identifies the factors most germane to assessing quantitative and qualitative human health risks.

TITLE: **Health Assessment Document for Inorganic Arsenic.** Final Report

AUTHOR: Jacobson-Kram, D.; Mushak, P.; Piscator, M.; Sivulka, D. J.; Chu, M.

SPONSOR: Environmental Protection Agency, Research Triangle Park, NC. Environmental Criteria and Assessment Office.

REPORT NUMBER: EPA-600/8-83-021F; NTIS: PB84-190891

NOTES: See also PB83-232306. (350p)

DATE: Mar 84

ABSTRACT: Inorganic arsenic, predominantly the tri- and pentavalent forms, is emitted to the environment primarily through smelting activity, biocide use and glass manufacturing. Monitoring data indicate a concentration of equal to or less than 0.1 microgram/cu m for most locations. Major routes of absorption of inorganic arsenic in the general population are inhalation and ingestion. Inhaled inorganic arsenic deposited in the lungs is eventually absorbed. Most ingested soluble inorganic arsenic is absorbed, whereas insoluble forms pass through the gastrointestinal tract with negligible absorption. Inorganic arsenic metabolism in man is complicated by biotransformation processes which include the methylation and oxidation-reduction interconversion of inorganic arsenic. Long-term accumulation of inorganic arsenic does not generally occur in physiologically active compartments in the body; renal clearance

appears to be the major route of excretion of absorbed inorganic arsenic. Acute symptoms of inorganic arsenic poisoning include severe gastrointestinal damage, facial edema, cardiovascular reactions, peripheral nervous system disturbances, and hematopoietic system effects. General population concerns arising from long-term exposures to moderate levels of inorganic arsenic include respiratory tract cancer, skin cancer, non-cancerous skin lesions, peripheral neuropathological effects and cardiovascular effects. There appears to be a nutritional requirement for low levels of inorganic arsenic in certain experimental animals; however, this requirement has not yet been established in man.

TITLE: **Impact of Tubificid Oligochaetes on Pollutant Transport in Bottom Sediments.** (Journal article)

AUTHOR: Karickhoff, S.W.; Morris, K.R.

SPONSOR: Environmental Research Lab., Athens, GA.

REPORT NUMBER: EPA/600/J-85/400; NTIS: PB85-170140/XAB

NOTES: Pub. in Environmental Science and Technology, v19 n1 p51-56 1985. (8p.)

DATE: 1985

ABSTRACT: Pollutant transport in bottom sediments effected by tubificid oligochaetes was studied in laboratory microcosms. Tubificids burrow in surfacial sediments (typically 6-10 cm), ingest sediment fines (silt and clay particles), and egest them at the sediment/water interface as sand-sized fecal pellets. Sorbed pollutants are transported by default in this process irrespective of the relative pollutant fugacities in the system. For the compounds studied (hexachlorobenzene, pentachlorobenzene, and trifluralin), more than 90% of the chemicals contained in the biologically worked zone were transported to the sediment surface via this process during a 30-50 day period. Pollutant release into the water column was not comparably enhanced, which showed a 4-6 fold increase (over a 90-day period) in the

presence of the worms. Pollutant release from intact fecal pellets was highly retarded by sorption.

TITLE: **Impact on and Recovery of Experimental Macrobenthic Communities Exposed to Pentachlorophenol.** (Journal article)

AUTHOR: Tagatz, M. E.; Deans, C. H.; Plaia, G. R.; Pool, J. D.

SPONSOR: Environmental Research Lab., Gulf Breeze, FL.

REPORT NUMBER: EPA-600/J-83-139; NTIS: PB84-144500

NOTES: Pub. in Northwest Gulf Science, v6 n2 p131-136 Oct 83. (8p)

DATE: 1983

ABSTRACT: Recovery of macrobenthic animal communities was determined 7 weeks after a 5-week exposure to 55 micrograms per liter pentachlorophenol. The communities developed from planktonic larvae in aquaria containing clean sand and continuously flowing estuarine water. Significantly fewer individuals and species occurred in contaminated aquaria than in control aquaria immediately after exposure to pentachlorophenol. Numbers of arthropods, chordates, echinoderms, and mollusks were decreased; annelids and coelenterates were not affected. Seven weeks after exposure was discontinued, and with continued input of estuarine water, the communities showed various degrees of recovery, carry-over effects, and changes unrelated to exposure.

TITLE: **Indices Identifying Subsurface Microbial Communities That Are Adapted to Organic Pollution**

AUTHOR: Smith, G. A.; Nickels, J.S.; Davis, J.D.; Findlay, R.H.; Vashio, P.S.

CORPORATE SOURCE: Florida State Univ., Tallahassee. Center for Biomedical and Toxicological Research.

SPONSOR: Robert S. Kerr Environmental Research Lab., Ada, OK.

REPORT NUMBER: EPA/600/D-85/055; NTIS: PB85-177780/XAB

CONTRACT NUMBER: EPA-R-809994

NOTES: (19p)

DATE: Mar 85

ABSTRACT: The subsurface microbiota and their extracellular excretion products are of primary importance in the maintenance of the ground-water resources particularly when the water is polluted. With the development of quantitative biochemical assays for biomass, community structure, and metabolic activities of the microbes of the subsurface sediments, it proved possible to search for assays that correlated with exposure to pollution. The subsurface sediments from an abandoned creosote waste deposit showed that exposure to pollution increased the total microbial biomass as measured by the extractable phospholipid; shifted the community structure by decreasing the proportion of gram positive bacteria that form glycerol teichoic acids and induced distinctive changes in the ester-linked phospholipid fatty acids.

TITLE: **Inorganic Arsenic Emissions from Glass Manufacturing Plants: Background Information for Proposed Standards.** (Draft rept. (Final))

AUTHOR: Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

REPORT NUMBER: EPA-450/3-83-011A; NTIS: PB84-152073

NOTES: (190p)

DATE: Apr 83

ABSTRACT: A national emission standard for glass manufacturing plants is being proposed under authority of Section 112 of the Clean Air Act. The purpose of the proposed standard is to minimize glass manufacturing furnace arsenic emissions to the level which, in the judgment of the Administrator of the U.S. Environmental Protection Agency, provides an ample margin of safety to protect the public health. The standard will have the effect of reducing uncontrolled emissions of arsenic from these furnaces by about 90 percent. Environmental impact and economic impact

statements quantifying the impacts of the proposed standard and alternative control options are included in the document.

TITLE: **Inorganic Arsenic Emissions from High-Arsenic Primary Copper Smelters - Background Information for Proposed Standards.** (Draft environmental impact statement (Final))

AUTHOR: Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

REPORT NUMBER: EPA-450/3-83-009A; NTIS: PB83-234120

NOTES: See also PB83-234138. (402p)

DATE: Apr 83

ABSTRACT: Standards of performance to control emissions of inorganic arsenic from new and existing primary copper smelters processing feed materials containing an annual average of 0.7 percent or greater arsenic are being proposed under Section 112 of the Clean Air Act. This document provides information on the background and authority, regulatory alternatives considered, and environmental and economic impacts of the regulatory alternatives.

TITLE: **Inorganic Arsenic Emissions from Low-Arsenic Primary Copper Smelters - Background Information for Proposed Standards.** (Draft environmental impact statement (Final))

SPONSOR: Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

REPORT NUMBER: EPA-450/3-83-010A; NTIS: PB83-234138

NOTES: See also PB83-234120. (490p)

DATE: Apr 83

ABSTRACT: Standards of performance to control emissions of inorganic arsenic from new and existing primary copper smelters processing feed materials containing an annual average of less than 0.7 percent arsenic are being proposed under Section 112 of the Clean Air Act. This document provides information on

the background and authority, regulatory alternatives considered, and environmental and economic impacts of the regulatory alternatives.

TITLE: **Mapping Sunken Pollutant Pools with Depth Finders.**

AUTHOR: Meyer, R. A.; Brugger, J. E.; Lowrance, D.J.

CORPORATE SOURCE: Rockwell International, Newbury Park, CA.

SPONSOR: Lowrance Electronics, Inc., Tulsa, OK.; Municipal Environmental Research Lab., Cincinnati, OH.

REPORT NUMBER: EPA-600/D-84-076; NTIS: PB84-168699

NOTES: Prepared in cooperation with Lowrance Electronics, Inc., Tulsa, OK. (24p)

DATE: 1984

ABSTRACT: Many hazardous substances and mixtures are immiscible with and more dense than water. When spillages or releases into waterbodies occur, the hazardous materials will disperse in a pattern controlled by physical properties of the material, flow and dispersion effects, and topography of the waterbody bed. Mapping (i.e., location and thickness determination) of the spilled substance is essential for prompt and economical removal to protect biota and ensure minimal contamination of water. Analysis of the reflection patters of acoustic waves (ca. 200 kHz) beamed into water from a boat is shown in this and in previous work to serve as an excellent mapping technique. When the project to map pollutants was initiated, no suitable commercial devices were available. A very effective, portable, battery-operated prototype system was constructed. The reflection data (intensity vs time) were displayed on an on-board dual-trace oscilloscope that had time-delay features. Subsequently a suitable commercial system was test marketed and has been successfully used

in the field to locate creosote in a waterbody.

TITLE: **Microbial Degradation of Selected Hazardous Materials; Pentachlorophenol, Hexachlorocyclopentadiene, and Methyl Parathion.** (Final rept. 11 Feb 77-11 May 7)

AUTHOR: Thuma, N. K.; O'Neill, P. E.; Brownlee, S. G.; Valentine, R. S.

CORPORATE SOURCE: Atlantic Research Corp., Alexandria, VA.

SPONSOR: Municipal Environmental Research Lab., Cincinnati, OH.

REPORT NUMBER: ARC-49-5707; EPA-600/2-83-117; NTIS: PB84-123934

CONTRACT NUMBER: EPA-68-03-2491

NOTES: (76p)

DATE: Nov 83

ABSTRACT: This program evaluated the use of selected pure culture microorganisms for potential in biodegrading the hazardous materials pentachlorophenol (PCP), hexachlorocyclopentadiene (HCCP), and methyl parathion (MP). Each chemical was separately challenged by each of 24 organisms in an aqueous medium under aerobic conditions. Following the initial screening and selection process, pure culture organisms identified as having potential for biodegradation of the selected chemicals were subjected to further testing and evaluation. Although no fully conclusive evidence of biodegradation of these substances was obtained, data indicated that a number of fungi have potential for disposal of PCP, HCCP, and MP. One bacterial culture demonstrated tolerance to PCP at 200 ppm in soil and appeared to reduce the PCP concentration in an aqueous medium when dextrose was provided. This isolate may have potential for removal of PCP from spill-contaminated areas. A fungus also showed some potential for degrading PCP. Time constraints and budgetary requirements precluded the use of C-14-labeled chemicals and the extensive analyses required for isolation, identification, and quantification of potential by-products and metabolities of

the biodegradation or biotransformation of the selected chemicals. Improvements on existing HPLC and GC-EC methods were developed.

TITLE: **Microbiological Decontamination of Pentachlorophenol-Contaminated Natural Waters.**

AUTHOR: Martinson, M. M.; Steiert, J. G.; Saber, D. L.; Mohn, W. W.; Crawford, R. L.

CORPORATE SOURCE: Minnesota Univ., Minneapolis.

SPONSOR: Environmental Research Lab. - Duluth, MN.

REPORT NUMBER: EPA/600/D-84/225; NTIS: PB84-246263

CONTRACT NUMBER: EPA-R-810016

NOTES: (18p)

DATE: Sep 84

ABSTRACT: Inoculation of pentachlorophenol-contaminated natural waters with cells of a pentachlorophenol-degrading Flavorbacterium was shown to be an effective method for decontamination of PCB-polluted aquatic environments. Numerous types of waters were decontaminated, including: river water, lake water, and groundwater. Decontamination was most effective between 15 C and 30 C, and between pH 7.5 and pH 9.0. Inoculation of waters with as few as 10,000 cells/ml resulted in effective PCP removal. PCB concentrations between 10 ppb and 100 ppm were reduced to undetectable levels, usually within 48 hours. Microbiological decontamination of PCP-polluted waters appears to be a promising waste treatment alternative when compared to traditional treatment techniques.

TITLE: **Multimedia Pollution Assessment of the Wood Products Industries.** (Final rept.)

AUTHOR: Casana, J.

CORPORATE SOURCE: Jordan (Edward C.) Co., Inc., Portland, ME.

SPONSOR: Industrial Environmental Research Lab.- Cincinnati, OH.

REPORT NUMBER: EPA-600/2-81-008; NTIS: PB84-160266

CONTRACT NUMBER: EPA-68-03-2605

NOTES: (296p)

DATE: Feb 84

ABSTRACT: This report presents a summary and commentary on pollutants, abatement technologies, and regulations in the wood products industries. Industries included in the study are pulp, paper and paperboard, veneer/plywood, particleboard, millwork and structural members, fabricated wood products, and gum and wood chemicals, and wood preserving. Water pollution abatement legislation has established guidelines based on Best Practicable Control Technology Currently Available (BPCTCA). These guidelines primarily address conventional pollutants, including five-day biochemical oxygen demand (BOD5), total suspended solids (TSS) and pH. In addition, guidelines based on Best Available Technology Economically Achievable (BATEA) and Best Conventional Pollutant Control Technology (BCPCT) are currently being established to address conventional, priority (toxic), and nonconventional (neither conventional nor toxic) pollutants. Existing external air pollution control devices, in conjunction with internal process controls, can be effective in the reduction of air pollutants, especially particulates and sulfur dioxide.

TITLE: **Pentachlorophenol in the Environment: Evidence for Its Origin from Commercial Pentachlorophenol by Negative Chemical Ionization Mass Spectrometry.** (Journal article)

AUTHOR: Kuehl, Douglas W.; Dougherty, Ralph C.

CORPORATE SOURCE: Florida State Univ., Tallahassee. Dept. of Chemistry.

SPONSOR: Environmental Research Lab., Gulf Breeze, FL.

REPORT NUMBER: EPA-600/J-80-085; ERL.GB-J0070; NTIS: PB81-125676

CONTRACT NUMBER: EPA-R-806334-00-10

NOTES: Pub. in Analytical Chemistry, v14 n4 p447-449 Apr 80. (5p)

DATE: 18 Jan 80

ABSTRACT: Commercial pentachlorophenol (PCP) contains significant quantities of tetrachlorophenol (TCP). The occurrence of TCP in environmental samples provides a chemical marker of PCP originating from commercial formulations. Negative chemical ionization mass spectrometry has been used to examine a commercial PCP formulation and a series of environmental and human samples. Tetrachlorophenol was determined by the ion current at m/z 229, tetrachlorophenoxide, and PCP was determined by the ion current at m/z 267, pentachlorophenoxide. The ion current at m/z 267 may include contributions from the oxygen/chloride exchange product of hexachlorobenzene, an environmental precursor of PCP. The ratio of PCP to TCP in Dowcide G-ST, a commercial PCP formulation, was 2.5 plus or minus 0.1. The ratio of m/z 267 to m/z 229 in a jellyfish, Mnemiopsis macrydi, from the Gulf of Mexico was 2.7 plus or minus 0.1, in human semen it was 4.1 plus or minus 0.1, and in human adipose tissue it was 15.5 plus or minus 0.1. PCP in the semen was concentrated in the sperm cells by a factor of 9.

TITLE: **Pentachlorophenol: Position Document 1.**

AUTHOR: Environmental Protection Agency, Arlington, VA. Ofice of Noise Abatement and Control.

REPORT NUMBER: EPA/SPRD-80/85; NTIS: PB81-109464

NOTES: (70p)

DATE: 18 Oct 78

ABSTRACT: The report is a preliminary risk assessment for pentachlorophenol. It gives a preliminary examination of its use, environmental residues, and health effects including toxicology data. Limited information is provided for exposure and extent of risk. Results of a literature search are provided.

TITLE: **Predator-Prey (Vole-Cricket) Interactions: The Effects of Wood Preservatives.** (Journal article)

AUTHOR: Gillett, J. W.; Gile, J. D.; Russell L.K.

CORPORATE SOURCE: Corvallis Environmental Research Lab., OR.

SPONSOR: Northrop Services, Inc., Corvallis, OR.

REPORT NUMBER: EPA-600/J-83-068; NTIS: PB84-110048

NOTES: Prepared in cooperation with Northrop Services. Inc., Corvallis, OR. Pub. in Environmental Toxicology and Chemistry, v2 p83-93. (13p)

DATE: c1983

ABSTRACT: The rate of loss of crickets (Acheta domestica), with and without the presence of an adventitious predator, the gray-tailed vole (Microtus canicaudus), has been studied in Terrestrial Microcosm Chambers (TMC-II) treated with pine stakes impregnated with creosote, bis(tri-n-butyltin) oxide (TBTO), dieldrin (HEOD), pentachlorophenol (PCP) or a toluene solvent control. The first-order rate of cricket loss (-k) increased only for HEOD, to a maximum at 33d post-treatment with oscillations of about a 16-d period. This result infers a 'cricket-available' compartment of HEOD and/or metabolites with concentrations that must be greater than those measured in air, soil, water or plants and other biota.

TITLE: **Preliminary Study of Sources of Inorganic Arsenic.** (Final rept.)

AUTHOR: Miles, A. J.; Brooks, G. W.; Keller, L. E.

CORPORATE SOURCE: Radian Corp., Durham, NC

SPONSOR: Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

REPORT NUMBER: RAD-82-240-016-18-12; EPA-450/5-82-005; NTIS: PB83-153528

CONTRACT NUMBER: EPA-68-02-3058

NOTES: (322p)

DATE: Aug 82

ABSTRACT: The purpose of this study was to analyze the severity of inorganic arsenic emissions from seven source categories including primary copper, lead, and zinc smelting, secondary lead smelting, cotton ginning, glass manufacturing, and arsenic chemical manufacturing. The magnitudes of arsenic emissions from each source category were quantified and control systems were investigated to determine baseline and estimated best control (EBC) for arsenic. The environmental, energy, and economic costs of implementing EBC, in source categories where it is not being used, were estimated. Two source categories, primary lead smelting and arsenic chemical manufacturing, were determined to have EBC in place as a result of compliance with existing regulations. The number of people exposed to arsenic from each of the source categories will be assessed separately by EPA using emissions and stack data generated in this study. The physical and chemical characteristics of arsenic and their impact on the control of arsenic emissions from the source categories were also examined.

TITLE: **Removal and Treatment of Contaminated River Bottoms: Field Demonstration.** (Final rept. Apr 73-Apr 75)

AUTHOR: Agnew, R. W.

CORPORATE SOURCE: Envirex, Inc., Milwaukee, WI.

SPONSOR: Municipal Environmental Research Lab., Cincinnati, OH.

REPORT NUMBER: EPA-600/2-84-006; NTIS: PB84-129022

CONTRACT NUMBER: EPA-68-03-0182

NOTES: (70p)

DATE: Jan 84

ABSTRACT: This report documents the results of a project to remove creosote contaminated river bottom muds from the Little Menomonee River in Milwaukee, Wisconsin. Bioassays were conducted to determine toxicity levels for aquatic organisms, and primary skin irritation tests were performed to establish skin irritation levels in humans. Based on these tests, an allowable residual concentration of 500 mg/kg of hexane solubles was established. The removal/treatment system was designed and operated to accomplish the cleanup with an absolute minimum of damage to the shoreline and adjacent land. The system consisted of two floating, hydraulically powered river sweepers to dredge mud from the river bottom and pump the material to a presettling tank for removal of sand and other high density solids.

TITLE: **Removal of Hazardous Material Spills from Bottoms of Flowing Waterbodies.** (Final rept. Jul 72-Dec 74)

AUTHOR: Hansen, Charles A.; Sanders, Robert G.

CORPORATE SOURCE: Rexnord, Inc., Milwaukee, WI.

SPONSOR: Municipal Environmental Research Lab., Cincinnati, OH

REPORT NUMBER: EPA/600/2-81-137; NTIS: PB81-230922

CONTRACT NUMBER: EPA-68-03-0181, EPA-68-03-0182

NOTES: Prepared in cooperation with Industrial Bio-Test Labs., Inc. Northbrook, IL. (113p)

DATE: Jul 81

ABSTRACT: This report documents the results of a study to determine the feasibility of removing spilled insoluble hazardous materials from the bottom of flowing watercourses. Descriptions are given of two full-scale systems developed to suck up spilled materials and contaminated bottom mud, remove excess water from the pumped slurry, and decontaminate the water removed so that it can be returned to the stream.

TITLE: **Removal of Phenolic Compounds from Wood Preserving Wastewaters.** (Final rept. Nov. 20, 78-May 20, 80)

AUTHOR: Wallin, Bruce K.; Condren, Arthur J.; Walden, Roy L.

CORPORATE SOURCE: Jordan (Edward C.) Co., Inc., Portland, ME.

SPONSOR: Industrial Environmental Research Lab.-Cincinnati, OH

REPORT NUMBER: EPA-600/2-81-043; NTIS: PB81-172637

CONTRACT NUMBER: EPA-68-03-2605

NOTES: (150p)

DATE: Mar 81

ABSTRACT: Laboratory and pilot-scale studies were undertaken to develop economically feasible technologies for the treatment of wastewaters from wood preserving operations. Of prime concern was the removal of phenol and its chlorinated derivatives, in particular, pentachlorophenol. Screening analysis of the wastewater indicated that pentachlorophenol was the only chlorinated derivative consistently present in concentrations of approximately 100 mg/l. Treatment technologies investigated for the treatment of these wastewaters included: (1) adsorption; (2) biological oxidation; (3) chemical oxidation; (4) coagulation; (5) extraction; and (6) pH adjustment. Each of the above, alone or in combination, was capable of yielding a measurable reduction in the concentration of total phenols and pentachlorophenol in the untreated wastewater. Two technologies yielded consistently high levels of treatment: pH adjustment of this wastewater, followed by adsorption with bentonite clay and final polishing by the polymeric adsorbant, XAD-4; and pH adjustment of the wastewater, followed by extraction with a mixture of No. 2 fuel oil and a co-solvent such as still bottoms from amyl alcohol production.

TITLE: **Screening Study to Development Background Information and Determine the Significance of Air Contaminant Emissions from Pesticide Plants.**

AUTHOR: Ifeadi, C. N.

CORPORATE SOURCE: Battelle Columbus Labs., Ohio.

SPONSOR: Environmental Protection Agency, Washington, D.C. Office of Pesticide Programs.

REPORT NUMBER: EPA/540/9-75/026; NTIS: PB-244 734/0

CONTRACT NUMBER: EPA-68-02-0611

NOTES: (85p)

DATE: Mar 75

ABSTRACT:

In this study, available background information is developed and the significance of air contaminant emissions from the manufacture of six pesticides determined. Pesticides studies are (1) insecticides: methyl parathion and toxaphene; (2) trifluralin; (3) fungicides and wood preservatives: pentachlorophenol; and (4) fumigant: paradichlorobenzene. Background information is gathered from published data and responses to the questionnaires sent to the pesticide manufacturing firms. Based on the available data, production projections are made up to the year 1980. A list of manufacturers of each pesticide is presented. Manufacturing processes, raw, and waste material handling, air contaminant emission sources, quantity or quality, and pollutants, together with their present practical control methods are discussed. Significance of air contaminant emissions from the pesticide industries is evaluated on the basis of available data on the emission quantities and/or toxicity of the pollutants emitted. Gaps in the data required to make a complete evaluation of significance are identified and recommendations to fill those gaps are made.

TITLE: **Selected Non-Carcinogenic Effects of Industrial Exposure to Inorganic Arsenic.** (Final rept.)

AUTHOR: Landau, Emanuel; Thompson, Donovan J.; Feldman, Robert G.; Goble, Guy J.; Dixon, Wilfrid J.

CORPORATE SOURCE: American Public Health Association, Washington, D.C.

SPONSOR: Boston Univ., Mass. School of Medicine; Washington Univ., Seattle. School of Public Health and Community Medicine.; California Univ., Los Angeles.; Environmental Protection Agency, Washington, D.C. Office of Toxic Substances.

REPORT NUMBER: EPA/560/6-77/018; NTIS: PB-276 988/3

CONTRACT NUMBER: EPA-68-01-2490

NOTES: Prepared in cooperation with Boston Univ., Mass. School of Medicine, California Univ., Los Angeles, Washington Univ., Seattle. School of Public Health and Community Medicine. (41p)

DATE: Oct 77

ABSTRACT: In June 1976, a study team representing four Universities and a research institution carried out a study of possible neurological effects of long-term exposure to airborne arsenic trioxide in a western copper smelter. The study involved comparing active working men heavily exposed to arsenic in the work force with workers not so exposed. Its purpose was to determine whether nerve conduction velocity can be utilized as a biological indicator of the subtle health effects of chronic exposure to inorganic arsenic in a community setting. The double-blind electrophysiologic and clinical study was based on 111 volunteers recruited from a selected set of smelter workers with at least five years of high urinary arsenic levels (37 men) and five years of low urinary levels (33 men). The control population consisted of members of the same union who worked at an aluminum plant in the same city (13 men) as well as male municipal employees with no industrial exposure (28 men). The conclusions of the study are that: (1)

chronic arsenic exposure in an industrial setting affects the peripheral nervous system, and (2) the neurologic parameters used in this study appear to be suitable for use in screening a community population for changes related to arsenical neuropathies.

TITLE: **Succession of Microfungi in Estuarine Microcosms Perturbed by Carbaryl, Methyl Parathion and Pentachlorophenol.** (Journal article)

AUTHOR: Cook, W. L.; Fiedler, Denise; Bourquin, A. W.

SPONSOR: Environmental Research Lab., Gulf Breeze, FL.

REPORT NUMBER: EPA-600/J-80-098; ERL/GB/CONTRIB-397; NTIS: PB81-129512

NOTES: Prepared in cooperation with Georgia State Univ., Atlanta. Dept. of Biology. Pub. in Botanica Marina, v23 p129-131 1980. (5p)

DATE: c1980

ABSTRACT: The effects of carbaryl, methylparathion and pentachlorophenol on the microfungal succession of an estuarine microcosm were examined. Resident fungi were succeeded by Fusarium in the carbaryl-treated microcosm; by a fungus in the Penicillium chrysogenum series in the methyl parathion-treated microcosm; and by a fungus in the Penicillium canescens series in the pentachlorophenol treated microcosm. Small quantities of 14C02 were released from the xenobiotic molecules by fungi selected from the microcosms.

TITLE: **Survey of Methods Used to Control Wastes Containing Hexachlorobenzene.** (Final rept.)

AUTHOR: Quinlivan, S.; Ghassemi, M.; Santy, M.

CORPORATE SOURCE: TRW Systems Group, Redondo Beach, Calif.

SPONSOR: Environmental Protection Agency, Washington, D.C. Office of Solid Waste Management Programs.

REPORT NUMBER: EPA/530/SW-120c; NTIS: PB-253 051/7

CONTRACT NUMBER: EPA-68-01-2956

NOTES: (92p)

DATE: 1976

ABSTRACT: This study presents the results of a survey of methods used to control wastes containing hexachlorobenzene (HCB). The specific objectives were to identify the sources and characteristics of manufacturing wastes containing HCB, to document methods used for treatment and disposal of HCB wastes, and to evaluate the environmental adequacy of the treatment and disposal methods.

TITLE: **Technical and Microeconomic Analysis of Arsenic and Its Compounds.** (Final rept. on task 2)

AUTHOR: Burruss, Jr., Robert P., Sargent, Donald H. Versar, Inc., Springfield, Va.

SPONSOR: Environmental Protection Agency, Washington, D.C. Office of Toxic Substances.

REPORT NUMBER: 454-2; EPA/560/6-76/016; NTIS: PB-253 980/7

CONTRACT NUMBER: EPA-68-01-2926

NOTES: See also report dated Mar 75, PB-244 625. (242p)

DATE: Apr 76

ABSTRACT: The role of arsenic (and its compounds) in the environment and in the economy of the United States was studied, to evaluate the need for and the projected effect of controlling its production, use, dissipation, and emission. The ocurrence, chemistry, and toxicology were reviewed; the prevalence of arsenic as an impurity in commercial raw materials, processes, and products was systematically documented; the intentional commercial flow of arsenical products was quantified; the sources of pollution were identified and characterized; and the health hazards were evaluated. The intentional production and use of arsenic and its compounds is greatly exceeded by the quantities unintentionally mobilized by industrial activities. The arsenic currently in food and water presents no identifiable health hazard, and present controls on

arsenical products, by a number of Government agencies, appear adequate. Emissions particulate collection devices appear adequate. Emissions to the air from high-temperature processes are large, particulate collection devices appear largely inadequate, and the dangers presented are of serious concern.

TITLE: **Toxicity of Creosote-Contaminted Sediment to Field-and Laboratory-Colonized Estuarine Benthic Communities.** (Journal article)

AUTHOR: Togatz, M.E.; Plaia, G.R.; Deans, C.H.; Lores E. M.

SPONSOR: Environmental Research Lab., Gulf Breeze, FL.

REPORT NUMBER: EPA-600/J-83-189; CONTRIB-486; NTIS: PB84-175231

NOTES: Pub. in Environmental Toxicology and Chemistry, v2 p441-450, 1983. (13p)

DATE: 8 Aug 83

ABSTRACT: Macrobenthic animal communities that colonized uncontaminated and creosote-contaminated sand during 8 weeks were compared to assess effects of marine-grade creosote on community structure. Aquaria were colonized in the laboratory by planktonic larvae entrained in continuously supplied unfiltered seawater and in the field by animals that occurred naturally. Individuals and species in aquaria that contained 844 and 4420 micrograms creosote/g were significantly fewer than those in the control. Abundance of animals in field-colonized communities contaminated with 177 micrograms/g, but not in laboratory-colonized communities, also was less than that in the control. The lowest concentration at either site that affected numbers of individuals or species was 844 micrograms/g for mollusks and 177 micrograms/g for echinoderms, annelids, and arthropods. Initial measured concentrations of creosote in sand (mid-range concentration) decreased by 30% in the laboratory and by 42% in the field at the end of the eight-week test.

TITLE: **Toxicity of Pentachlorophenol and Related Compounds to Early Life Stages of Selected Estuarine Animals.** (Journal article (Final))

AUTHOR: Borthwick, Patrick W.; Schimmel, Steven C.

SPONSOR: Environmental Research Lab., Gulf Breeze, FL.

REPORT NUMBER: EPA/600/J-78/076; CONTRIB-343; NTIS: PB-290 073/6

NOTES: Pub. in Pentachlorophenol, p141-146 1978. (8p)

DATE: 1978

ABSTRACT: Newly hatched individuals of four estuarine species were exposed to pentachlorophenol (PCP), sodium pentachlorophenate (Na-PCP), or Dowicide G (79%Na-PCP), in static toxicity tests. The 96-hour LC50 values for sheepshead minnow (Cyprinodon variegatus) fry exposed to PCP at ages 1-day, 2-week, 4-week, and 6-week were 329, 392, 240, and 223 micrograms/l, respectively. The 96-hour LC50 value for 2-week-old fry exposed to Dowicide G was 516 micrograms/l. The larvae (48-hour post hatch) of pinfish, Lagodon rhomboides, were particularly sensitive to Na-PCP (96 hour LC50: 38 micrograms/l) and Dowicide G(96-hour LC50:66 micrograms/l). For 24-hour-old grass shrimp (Palaemonetes pugio) larvae exposed to NA-PCP the 96-hour LC50 was 649 micrograms/l. NaPCP caused abnormal development of eastern oyster (Crassostrea virginica) embryos, the 48-hour EC50 being 40 micrograms/l.

TITLE: **Treating Wood Perserving Plant Wastewater by Chemical and Biological Methods.** (Final rept.)

AUTHOR: White, John T.; Bursztynsky, T. A.; Crane, John D.; Jones, Richard H.

CORPORATE SOURCE: Environmental Science and Engineering, Inc., Gainesville, Fla.

SPONSOR: Koppers Co., Inc., Pittsburgh, Pa. Forest Products Div.; Industrial Environmental Research Lab.-Cincinnati, Ohio.

REPORT NUMBER: EPA/600/2-76/231; NTIS: PB-265 454/9

CONTRACT NUMBER: EPA-12100-HIG

NOTES: Prepared by Koppers Co., Inc., Pittsburgh, Pa. Forest Products Div. (111p)

DATE: Sep 76

ABSTRACT: A completely mixed activated sludge system was designed for a wood preserving plant with an average daily wastewater flow of 27,000 l/day (7,150 gal/day), a BOD concentration of 1,100 mg/l, and a phenol concentration of 120 mg/l. Included in the design were capabilities for pre- and post-chlorination. The activated sludge system alone was capable of removing 90 percent BOD, 75 percent COD, 99 percent phenol, and 76 percent pentachlorophenol. Post chlorination dosages of over 50 mg/l resulted in 50 and 52 percent reductions of phenol and pentachlorophenol, respectively. Laboratory pre-chlorination studies showed removal of phenol and pentachlorophenol at chlorine dosages in excess of 250 mg/l.

TITLE: **Validation of an Emission Measurement Method for Inorganic Arsenic from Stationary Sources: Proposed Method 108. Laboratory and Field Test Evaluation.** (Final rept.)

AUTHOR: Ward, T. E.; Jayanty, R. K. M.; Groshse, P. M.; Gutknecht, W. F.; Brutfey, C. L.

CORPORATE SOURCE: Research Triangle Inst., Research Triangle Park, NC.

SPONSOR: PEDCo-Environmental, Inc., Cincinnati, OH.; Environmental Monitoring Systems Lab., Research Triangle Park, NC.

REPORT NUMBER: EPA/600/4-84/080; NTIS: PB85-115160/XAB

CONTRACT NUMBER: EPA-68-02-3767

NOTES: Prepared in cooperation with PEDCo-Environmental, Inc., Cincinnati, OH. (94p)

DATE: Oct 84

ABSTRACT: The United States Environmental Protection Agency (USEPA) has listed inorganic arsenic emissions as a hazardous air pollutant. USEPA proposed Method 108 for the measurement of

these emissions from stationary sources has been subjected to validation studies in this work. Laboratory and field studies were performed. Laboratory studies included analysis of laboratory samples, preparation and analysis of liquid and filter audit samples, and sample stability determinations. Field studies included determination of the precision of the method in the measurement of inorganic arsenic emissions from stationary sources at the two industries currently subject to the USEPA proposed inorganic arsenic emissions regulations. Considering the sampling sites and the variability of process operations, these results indicate a highly acceptable degree of precision. Literature reviews to reveal the sources of emissions are reported. Recommendations are made for improving the method.

TITLE: **Wood Preservatives Decision Fact Sheet**

AUTHOR: USEPA Office of Pesticide Programs

NOTE: In Office of Pesticide Program Fact Sheets (6p.)

DATE: July 11, 1984

ABSTRACT: No Abstract Available

TITLE: **Wood Preservative Pesticides Creosote, Pentachlorophenol and the Inorganic Arsenicals (Wood Uses) Position Document 2/3.**

AUTHOR: Environmental Protection Agency, Washington, D.C. Office of Pesticides and Toxic Substances.

REPORT NUMBER: EPA-540/9-82-004; NTIS: PB82-229956

NOTES: Errata sheet inserted. (906p)

DATE: Mar 82

ABSTRACT: This document details the final determination regarding the Rebuttable Presumption Against Registration (RPAR) of products containing the above chemical. The responses by EPA to comments on the preliminary determination by

the Scientific Advisory Panel and the United States Department of Agriculture are contained in the document. A bibliography of citations used in this final determination is also provided.

TITLE: **Wood Preservative Pesticides: Creosote, Pentachlorophenol and the Inorganic Arsenicals. Position Document 4.**

AUTHOR: Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.

REPORT NUMBER: EPA/540/9-84/003; NTIS: PB84-241538

NOTES: See also PB82-229956. (367p)

DATE: Jul 84

ABSTRACT: This Position Document 4 contains the Environmental Protection Agency's (EPA) final decision on the Wood Preservatives Pentachlorophenol, Creosote and Inorganic Arsenicals. EPA has decided to: restrict use of these chemicals to certified applicators; require reduction of dioxin (HxCDD) in pentachlorophenol products; institute a consumer awareness program for safe handling of pressure-treated wood; and further protect workers in wood treatment plants through protective clothing and other measures. This regulatory action was taken under the authority of the Federal Insecticide, Fungicide and Rodenticide Act.

TITLE: **Wood Preserving Industry Multimedia Emission Inventory.** (Final rept. Apr 78-Jun 80)

AUTHOR: DaRos, Bruce; Fitch, Bill; Franklin, Carole; Friedman, Mike; Merrill, Richard

SPONSOR: Industrial Environmental Research Lab.- Cincinnati, OH.

REPORT NUMBER: ACUREX-FR-80-53/EE; EPA-600/2-81-066; NTIS: PB81-205999

CONTRACT NUMBER: EPA-68-03-2584

NOTES: Acurex Corp., Mountain View, CA. Energy and Environmental Div. (269p)

DATE: Apr 81

ABSTRACT: Restriction of the discharge of wastewater generated during the preservation of wood has resulted in the increased use of evaporation techniques by the wood preserving industry. This report discusses emissions that may occur during evaporation and projects the pollutant burden on the environment. The information presented includes a description of the wood preserving industry, its products, the regulations impacting its emissions, and the nature of its emissions. The application of preservatives is discussed in detail and includes discussions of the waste streams generated during the treatment process. Disposal of the generated wastewater is the primary topic of discussion, supported by the laboratory and field sampling data. The measured emissions are compared to evaporation models, followed by an industrywide projection of the emission of organics if evaporation is used for the disposal of wastewater. The impact of regulations on future emission rates is also projected. The primary conclusion of this work is that organic compounds are emitted to the atmosphere during evaporation. The rate of release is based on the type of evaporation system used: solar ponds, thermal (pan) evaporators, spray ponds or cooling towers; the temperature (thermal) driving force used; the molecular weight and volatility of the substances; and the concentration of each component in solution following wastewater pretreatment.

TITLE: **[Settlement agreement between EPA and the American Wood Preservers Institute. FIFRA Docket Nos. 529, et al.]**

AUTHOR: U.S. Environmental Protection Agency

REPORT NUMBER: EPA 540/MISC, FIFRA DOCKET NO. 529, et al.

ABSTRACT: A settlement agreement on regulatory measures covering the distribution, sale and use of pesticides for preserving wood has been reached by the U.S. Environmental Protection Agency and major parties representing the wood preserving industry. However, the issue of what hexachlorodibenzo-p-dioxin (HxCDD) contaminant limit will be imposed for pentachlorophenol products was not resolved by the settlement. The agreement was signed

on September 30. Representatives of the wood preserving industry participating in the agreement were the American Wood Preservers Institute, the National Forest Products Association, the Society of American Wood Preservers, the Chapman Chemical Company, and other wood preservative registrants. The terms of this settlement agreement, will be implemented through notice in the Federal Register. In July, 1984, the agency issued a notice requiring extensive changes to the terms and conditions of registration for the wood preservative pesticides creosote, pentachlorophenol, and inorganic arsenicals. The changes restricted the use of these products to certified applicators, required protective clothing for workers using the chemicals, and imposed a limitation on the HxCDD contamination of pentachlorophenol. The notice also called for the implementation of aconsumer awareness program to inform the public about the proper use and handling of wood treated with preservatives. Numerous registrants, trade associations and user groups challenged the agency's action under provisions of the Federal Insecticide, Fungicide and Rodenticide Act and requested a hearing beofre an administrative law judge. These requests automatically delayed the effective date of the agency's action. In the settlement that has been reached, EPA and the participating parties have agreed to adopt certain modifications in the registrations of the three wood preservative pesticides, thus avoiding a lengthy hearing on these issues. Specifically, the settlement agreement includes provisions for restricting most uses of wood preservatives to certified applicators; label changes governing the use of the preservtives; and measures to reduce worker exposure, including the wearing of protective clothing. For the limited number of creosote uses not restricted to certified applicators, the industry has agreed to adopt stringent packaging and labeling restrictions for the affected products and to institute a mandatory, EPA-approved training program for all applicators. Also under the agreement, the trade associations (on behalf of their members) have agreed to implement a voluntary consumer awareness program for providing the public with information about the proper use, handling and disposal of treated wood. Ths

program includes an industry-sponsored audit approved by the agency which is designed to evaluate the success of the voluntary program. The associations have agreed to begin this program within 60 days. The agreement does not resolve the issue of the HxCCD limitation for pentachlorophenol products. The agency and certain pentachlorophenol registrants are currently involved in negotiations on this issue. Copies of this agreement can be obtained by calling or writing to:

Office of Public Affairs (A-107)
U.S. Environmental Protection Agency
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