

Experience in Working with PCB Pollution Issues

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December 2009

In the 1960s, when he held the position of Professor of Water Chemistry and Director of the Water Chemistry Program at the University of Wisconsin, Madison, Dr. Lee directed the masters thesis and PhD dissertation work of a number of his graduate students on the occurrence, fate and effects of organochlorine pesticides in aquatic systems. During the course of that work they discovered that what some other investigators had reported to be DDT residues in birds was not in fact DDT, but rather was polychlorinated biphenyls (PCBs). Lee and his graduate students were among some of the first in the US to investigate the occurrence of PCBs in aquatic systems, and the sources of those PCBs; he directed the work of one of his PhD students specifically on environmental issues associated with PCBs.

Dr. Lee's pioneering work on PCBs gained national recognition, including his being interviewed by Walter Cronkite for the *CBS Evening News*. One of his graduate students whose PhD dissertation was devoted to PCB issues, Dr. Gilman Veith, became employed by the US EPA and directed the Agency's work on PCBs in the 1970s, which led to the PCB regulations that were adopted as part of the Toxic Substances Control Act (TSCA). The Veith and Lee papers on the PCB-pollution of water, sediments, and fish are available on www.gfredlee.com as,

Veith, G., and Lee, G. F., "A Review of Chlorinated Biphenyl Contamination in Natural Waters," *Water Research* 4:265-269 (1970).

<http://www.gfredlee.com/HazChemSites/Veith-Lee-ReviewPCB.pdf>

Veith, G., and Lee, G. F., "PCBs in Fish from the Milwaukee Region," Proc. 14th Conf. Great Lakes Res., Internat. Assoc. Great Lakes Res. pp. 157-169 (1971).

<http://www.gfredlee.com/HazChemSites/Veith-Lee-PCBFishMKE.pdf>

Veith, G., and Lee, G. F., "Chlorobiphenyls (PCBs) in the Milwaukee River," *Water Research* 5:1107-1115 (1971).

<http://www.gfredlee.com/HazChemSites/Veith-Lee-PCB-MKERiver.pdf>

PCBs were among the organochlorine compounds included in Lee's \$1-million laboratory and field investigation of the release of sediment-associated pollutants during dredging and dredged sediment disposal in the 1970s under contract with the US Army Engineer Waterway Experiment Station. That study examined the behavior of about 30 chemical parameters in sediments from about 100 different sites across the US. The Corps of Engineers reports on that work were released as,

Lee, G. F., Jones, R. A., Saleh, F. Y., Mariani, G. M., Homer, D. H., Butler, J. S. and Bandyopadhyay, P., "Evaluation of the Elutriate Test as a Method of Predicting Contaminant Release during Open Water Disposal of Dredged Sediment and Environmental Impact of Open Water Dredged Materials Disposal, Vol. II: Data Report," Technical Report D-78-45, US Army Engineer Waterway Experiment Station, Vicksburg, MS, 1186 pp., August (1978)..

Jones, R. A. and Lee, G. F., "Evaluation of the Elutriate Test as a Method of Predicting Contaminant Release during Open Water Disposal of Dredged Sediment and Environmental Impact of Open Water Dredged Material Disposal, Vol. I: Discussion," Tech Report D-78-45, US Army Engineer Waterway Experiment Station, Vicksburg, MS, August (1978).

Those studies revealed that PCBs associated with sandy sediments tended to be released when the sediments were suspended in water, while the PCBs associated with sediments having high organic content were more tightly bound to the sediments.

Because of the widespread occurrence of PCBs in aquatic sediments, the US Army Corps of Engineers issued a contract to Dr. Lee to develop a review of PCBs in sediments and the potential impact of PCB-contamination of sediments on the Corps' dredging of US waterway sediments to maintain navigation depth. That work resulted in the publication of the report,

Lee, G. F. and Jones, R. A., "Significance of PCBs in Dredged Sediment," Final Report to the US Army Engineer Waterways Experiment Station, Vicksburg, MS, August (1979).

Dr. Lee served as a member of the PCB criterion review panel for the American Fisheries Society's Water Quality Panel review of the US EPA "Red Book" of Water Quality Criteria—1976. In addition, on behalf of the US Public Health Service, he chaired a committee responsible for evaluating the need for a drinking water MCL for PCBs.

The advice of Dr. Lee has been sought in the assessment, impacts, and management of PCB-polluted sediments in a number of areas including the Hudson River and Hudson River Estuary near New York City. On several occasions he was asked by the US EPA Region 2 to advise it on the approach that should be used to control excessive PCB accumulation in striped bass in the Hudson River. He was also involved as an advisor on issues of PCB accumulation in waterbodies in the state of Wisconsin, including the Milwaukee River. His work on managing PCB-contaminated sediments also included serving as an advisor to Outboard Marine Corporation on the PCB-pollution of sediments of Waukegan Harbor (Wisconsin). In addition, PCBs are an issue of concern at the UCD/DOE LEHR National Priority List Superfund site for which he served for 15 years as the US EPA-sponsored Technical Assistance Grant advisor to the public on the adequacy of the site investigation and remediation.

Dr. Lee has been involved in evaluating the potential for PCBs in hazardous chemical landfills to pollute groundwaters, including the Wayne Disposal Landfill for the Ypsilanti Township, Michigan, and the BFI/CECOS Landfill in Clermont County, Ohio. Dr. Lee has served as an advisor to the Sierra Club of Canada on approaches for the remediation of PCB-contaminated sediment of the Sydney Tar Ponds located at Sydney, Nova Scotia. That work is available as,

Lee, G. F., "Comments on, 'Remediation of Sydney Tar Ponds and Coke Ovens Sites Environmental Impact Statement, Sydney, Nova Scotia,' dated December 2005," Report of G. Fred Lee & Associates, El Macero, CA, USA, May 15 (2006).

<http://www.gfredlee.com/Landfills/SydneyTarPondsReport.pdf>

Lee, G. F. and Jones-Lee, A., "Progress toward Remediation of the Sydney Tar Ponds: A Major Canadian PCB/PAH 'Superfund' Site," *Journal Remediation* 17(1):111-119 (2006). <http://www.gfredlee.com/Landfills/STP-Remediation-pap.pdf>

In connection with reviewing the potential environmental and public health hazards of PCBs Dr. Lee developed the reports,

Lee, G. F., and Jones-Lee, A., "Comments on 'US Gypsum Draft Environmental Impact Statement for the Development of the US Gypsum Proposed Wallboard Plant to be Located on Port of Stockton West Complex,'" Comments submitted to Lozeau/Drury, Alameda, CA by G. Fred Lee & Associates, El Macero, CA, December 15 (2008). <http://www.gfredlee.com/HazChemSites/USGypsumDEIR.pdf>

Lee, G.F., and Jones-Lee, A., "TCLP Not Reliable for Evaluation of Potential Public Health and Environmental Hazards of PCBs or Other Chemicals in Wastes: Unreliability of Cement-Based Solidification/Stabilization of Wastes," Report of G. Fred Lee & Associates, El Macero, CA, September (2009). http://www.gfredlee.com/Landfills/TCLP_Solidification.pdf

Dr. Lee has been involved in reviewing the historical information on the pollution of Fox River in Wisconsin by paper mill discharges.

On behalf of the California Water Resources Control Board Drs. Lee and Jones-Lee conducted a comprehensive review of the data base on organochlorine "legacy" pesticides and PCBs in fish in California Central Valley waterbodies from the late 1970s through 2005. Those data showed that while the concentrations of organochlorine pesticides in fish tissue have been decreasing, the PCB content of fish tissue has not. Their findings are available in the following reports:

Lee, G. F. and Jones-Lee, A., "Organochlorine Pesticide, PCB and Dioxin/Furan Excessive Bioaccumulation Management Guidance," California Water Institute Report TP 02-06 to the California Water Resources Control Board/Central Valley Regional Water Quality Control Board, 170 pp, California State University Fresno, Fresno, CA, December (2002). <http://www.gfredlee.com/SurfaceWQ/OCITMDLRpt12-11-02.pdf>

Lee, G. F. and Jones-Lee, A., "Excessive Bioaccumulation of Organochlorine Legacy Pesticides & PCBs in CA Central Valley Fish," PowerPoint Slides made available at US EPA National Fish Contaminant Forum, San Diego, CA, January (2004). <http://www.gfredlee.com/Runoff/OC1-slides-SanDiego.pdf>

On behalf of William Jennings, DeltaKeeper, Dr. Lee and his associates demonstrated the approach that can be used to evaluate the bioavailability of PCBs in contaminated sediments. Their report on that work is available as:

Lee, G. F., Jones-Lee, A., and Ogle, R. S., "Preliminary Assessment of the Bioaccumulation of PCBs and Organochlorine Pesticides in *Lumbriculus variegatus* from City of Stockton Smith Canal Sediments, and Toxicity of City of Stockton Smith Canal Sediments to *Hyalella azteca*," Report to the DeltaKeeper and the Central Valley

Regional Water Quality Control Board, G. Fred Lee & Associates, El Macero, CA, July (2002). <http://www.gfredlee.com/HazChemSites/SmithCanalReport.pdf>

Dr. Lee has provided guidance on developing TMDLs to control the bioaccumulation of PCBs:
Lee, G.F, and Jones-Lee, A., "Developing TMDLs for Organochlorine Pesticides and PCBs," Presented at the American Chemical Society Environmental Chemistry Division national meeting in San Diego, California, April (2001).
http://www.gfredlee.com/Runoff/sandiego_030801.pdf

Dr. Lee has been active in evaluating the potential impact of disposal of PCB-contaminated sediments in a Chemical Waste Unit landfill in DeWitt County, Illinois. This activity included developing a report,

Lee, G. F., and Jones-Lee, A., "Evaluation of the Potential for Area Disposal Company Proposed Chemical Waste Unit Landfill to Pollute the County Water Resources with Hazardous Chemicals," Report to County Board, DeWitt Co., IL. Report of G. Fred Lee & Associates, El Macero, CA, May 7 (2009).

http://www.gfredlee.com/Landfills/Clinton_IL_CWU.pdf

Copies of Dr. Lee's reports on these and other studies are available on his website: www.gfredlee.com in the Landfills-Groundwater Section "Examples of Specific Landfill Studies" subsection [<http://www.gfredlee.com/plandfil2.htm#examples>], in the "Hazardous Chemical Sites" section [<http://www.gfredlee.com/phazchem2.htm>], as well as in other sections.