

## **CURRICULUM VITAE**

September 2001

### **Gary Lawrence Mills**

Associate Research Scientist  
Savannah River Ecology Laboratory  
University of Georgia

Adjunct Associate Professor  
Environmental Engineering & Science  
Clemson University

Adjunct Associate Professor  
Department of Geology  
Texas A&M University

Adjunct Research Scientist  
Department of Crop and Soil Sciences &  
Department of Geology  
University of Georgia

### **EDUCATION:**

B.S., Biology  
Southern Connecticut State College, May 1975

Ph.D., Chemical Oceanography  
University of Rhode Island, December 1982  
Thesis: Chemical Nature and Geochemistry of Copper-Organic Complexes in Narragansett Bay, Rhode Island.

### **PROFESSIONAL EXPERIENCE:**

Associate Research Scientist (7/91 - Present)  
Savannah River Ecology Laboratory  
University of Georgia

Assistant Research Scientist (10/83 - 7/91)  
Savannah River Ecology Laboratory  
University of Georgia

Research Associate (1/81 - 10/83)  
School of Oceanography  
University of Rhode Island

Graduate Research Assistant (9/76 - 1/81)  
School of Oceanography  
University of Rhode Island

Environmental Chemist (5/75 - 9/76)  
Department of Environmental Hygiene and Toxicology  
Olin Corporation

### **CURRENT RESEARCH AREAS:**

Biogeochemistry of lipids  
Transport and transformations of organic contaminants in surface and subsurface aquatic systems  
Bioremediation of petroleum derived contaminants  
Remediation of chlorinated solvents

### **TEACHING:**

Anthropogenic Organic Compounds in the Environment” (CSS 468/668), Winter Quarter, Alternate Years, University of Georgia, Department of Crop and Soil Science

Converted course to the UGA semester system with Dr. Valentine Nzengung, Department of Geology, new course title “Organic Contaminant hydrogeology”

### **PROFESSIONAL SOCIETY MEMBERSHIP:**

American Chemical Society  
Society of Environmental Toxicology and Chemistry  
American Society of Mass Spectrometry

### **RECENT SERVICE ACTIVITIES:**

#### **Professional Society Activities:**

Member, Long Range Planning Committee, Environmental Chemistry Division, 1994-1996 American Chemical Society.

Chairman, Membership Committee, Environmental Chemistry Division, American Chemical Society 1994-1996.

Member, Board of Directors, Carolinas Regional Chapter of the Society of Environmental Toxicology and Chemistry 1992.

Member at Large, Executive Committee, Environmental Chemistry Division, American Chemical Society, 1994-1995 Elected Term.

Judge, Student Paper Awards, 203rd through 211th National Meeting of the American Chemical Society, Environmental Chemistry Division.

Treasurer, American Chemical Society, Environmental Chemistry Division 1996 -1998 Elected Term

Judge, Student Paper Awards, SETAC 21<sup>st</sup> Annual Meeting, Nashville, TN, 2000.

#### **Related Professional Activities:**

Organizer for symposium entitled “Petroleum contamination in the environment : Assessment and remediation” at the 211th National Meeting of the American Chemical Society in New Orleans, March 24-29, 1996. Symposium included 2 days of technical presentations with 26 papers presented by scientist from academia, industry, and federal laboratories.

### **PUBLICATIONS:**

Mills, G.L. and J.G. Quinn. (1979). Determination of organic carbon in marine sediments by persulfate oxidation. Chemical Geology 25:155-162.

Mills, G.L. and J.G. Quinn. (1981). Isolation of dissolved organic matter and copper-organic complexes from estuarine

waters using C18 reverse-phase liquid chromatography. *Marine Chemistry* 10:93-103.

Mills, G.L., A.K. Hanson, Jr., J.G. Quinn, W.R. Lamella, and N.D. Chasteen. (1982). Chemical studies of copper-organic complexes isolated from estuarine waters using C18 reverse-phase liquid chromatography. *Marine Chemistry* 11:355-377.

Hoffman, E.J., J.S. Latimer, G.L. Mills, and J.G. Quinn. (1983). Petroleum hydrocarbons in urban runoff from a commercial land use area. *Journal of the Water Pollution Control Federation* 54:1517-1525.

Hoffman, E.J., G.L. Mills, J.S. Latimer, and J.G. Quinn. (1983). Annual fluxes of petroleum hydrocarbons to the coastal environment via urban runoff. *Canadian Journal of Fisheries and Aquatic Sciences* 40: (supplement 2) 41-53.

Hoffman, E.J., G.L. Mills, J.S. Latimer, and J.G. Quinn. (1984). Urban runoff as a source of polycyclic aromatic hydrocarbons to coastal waters. *Environmental Science and Technology* 18:580-587.

Mills, G.L. and J.G. Quinn. (1984). Dissolved copper and copper-organic complexes in the Narragansett Bay Estuary. *Marine Chemistry* 15:151-172.

Adriano, D.C., G.L. Mills, J.L. Afre, and R.J. Hart. (1984). Fate and behavior of an organo-borate in the soil-plant system. *Proceedings of the International Conference on Environmental Contamination, United Nations Environment Program* pp. 749-764.

Hoffman, E.J., J.S. Latimer, C.D. Hunt, G.L. Mills, and J.G. Quinn. (1985). Stormwater runoff from highways: chemical and physical characteristics and implications for treatment. *Water, Air and Soil Pollution* 25:349-364.

Latimer, J.S., G.L. Mills, E.J. Hoffman, and J.G. Quinn. (1985). Treatment of solids and petroleum hydrocarbons in storm runoff at a commercial land use utilizing an on-site detention basin. *Bulletin of Environmental Contamination and Toxicology* 36: 548-555.

Douglas G.S., G.L. Mills, and J.G. Quinn. (1986). Organic copper and chromium complexes in the interstitial waters of Narragansett Bay sediments. *Marine Chemistry* 19:161-174.

Mills, G.L., E. McFadden, and J.G. Quinn. (1986). Chromatographic studies of dissolved organic matter and copper-organic complexes isolated from estuarine waters. *Marine Chemistry* 20:313-325.

Loehle, C., P.M. Bertsch, and G.L. Mills. (1986). An Evaluation of Chemical Speciation in the Metal Transport Model MEXAMS. *Environmental Software* 1: 106-112.

Mills, G.L., D.C. Schwind, and D.C. Adriano. (1988). Preconcentration and analysis of tetraphenylboron and diphenylborinic acid in natural waters using C18 reverse-phase liquid chromatography. *Chemosphere* 17:937-942.

Adriano, D.C., D.I. Kaplan, W.G. Burkman, and G.L. Mills. (1988). Long-term phytoavailability of soil-applied organo-borates. *Journal of Environmental Quality* 17:485-492.

Mills, G.L., G.S. Douglas, and J.G. Quinn. (1989). Dissolved organic copper concentrations in an anoxic basin located in the Pettaquamscutt River estuary. *Marine Chemistry* 26:277-288.

Mills, G.L. and D.C. Schwind. (1989). Photochemical degradation of tetraphenylboron and diphenylborinic acid sensitized by dissolved organic matter in natural water. *Environmental Toxicology and Chemistry* 9:569-574.

Mills, G.L., D. Kaplan, D. Schwind, and D.C. Adriano. (1989). Surface facilitated chemical degradation of tetraphenylboron in soil. *Journal of Environmental Quality* 19:135-140.

Shorten, C.V., A.W. Elzerman, and G.L. Mills. (1989). Methods for the determination of PAH desorption kinetics in coal fines and coal contaminated sediments. *Chemosphere* 20:137-160.

Kaplan, D.I., W.G. Burkman, D.C. Adriano, and G. L. Mills. (1990). Determination of boron in soils containing inorganic

and organic sources. *Journal of the Soil Science Society of America* 54:708-714.

Sandhu, S.S. and G.L. Mills. (1991). Mechanisms of mobilization and attenuation of inorganic contaminants in coal ash basins. In: *Emerging Technologies in Hazardous Waste Management II*, D.W Tedder and F.G. Pohland, Eds., American Chemical Society, Washington, D.C. pp. 342-364.

Chin, P.F. and G.L. Mills. (1991). Kinetics and mechanisms of kaolinite dissolution: effects of organic ligands. *Chemical Geology* 90:307-317.

Novak, J.M., G.L. Mills, and P.M. Bertsch. (1991). Estimating the percent aromatic carbon in soil and aquatic humic substances using ultraviolet absorbance spectroscopy. *J. Environ. Qual.* 21:144-147.

Sandhu, S.S. and G.L. Mills. (1992). Leachability of Ni, Cd, Cr, and As from coal ash impoundments of different age on the Savannah River Site. In: *Coal and Coal Combustion Residues*, K.S. Sajwan, D.C. Adriano, and R.F. Keefer, Lewis Publishers, Chelsea, Michigan.

Novak, J.M., P.M. Bertsch, and G.L. Mills. (1992). <sup>13</sup>C NMR study of water-soluble organic carbon isolated using different filter media. *Journal of Environmental Quality* 21:537-539.

Sandhu, S.S. and G.L. Mills. (1993). Leachability of Ni, Cd, Cr, and As from coal ash impoundments of different age on the Savannah River Site. In: *Trace Elements in Coal and Coal Combustion Residues*, R. F. Keefer and K.S. Sajwan (Eds), pp. 165-182. Lewis Publishers, Boca Raton, Florida.

McArthur, J V., R.R. Rader, J.M. Aho, and G.L. Mills. (1994). Interspecific leaf interactions during decomposition in aquatic and floodplain ecosystems. *J. North American Benthological Society* 13: 57-67..

Sandhu, S.S. K.S. Sajwan, G.L. Mills, and F.Harrison. (1994). Effects of leachate from coal ash basins of varying age on groundwater quality. In: *Hydrology Days*, 14th edition. American Geophysical Union, Atherton, California pp.383-394.

Mills, G.L., Wolfe, C.P., and Dalton, B.R. (1995). Free and humic-bound carbohydrates leached from leaves of four floodplain tree species. *Communications in Soil Science and Plant Analysis*, 26: 3335-3342.

Mills, G.L. and Sullivan L.R. (1995). Indirect photolysis of tetraphenylborate sensitized by humic acid. *Chemosphere*, 31: 4541-4548.

Olson, J.J., G.L. Mills, B.E. Herbert, and P. J. Morris. (1999). Biodegradation of separated diesel components. *Environmental Toxicology and Chemistry* 18: 2448-2453.

Nzungu V.A., R.A. Castillo, W.P. Gates, and G.L. Mills (2001). Abiotic transformation of perchloroethylene in homogeneous dithionite solution and in suspensions of dithionite-treated clay minerals. *Environmental Science and Technology*, 35, 2244-2251.

Mills, G.L., J.V. McArthur, C.P. Wolfe, J.M. Aho, and R.B. Rader. (2001). Lipid composition of decomposing leaf litter in a southeastern blackwater stream. *Archiv für Hydrobiologie*. In Press.

Minahan, K., G.L. Mills, S. Hayden, and J.W. Gibbons. (2001) An assessment of hydrocarbon contamination derived from roofing material cover boards. *Herpetological Review*. In press.

#### **Submitted:**

Mills, G.L. McArthur, and C.P. Wolfe (2001) Lipid composition of suspended particulate matter (SPOM) in a southeastern blackwater stream. *Water Research* (Accepted with revisions).

Hudson, R.J., G.L. Mills, and B.E. Herbert. Deuterium-labeled organic compounds as solute tracers in sorption reactions

involving petroleum hydrocarbons. J. of Environmental Quality.

**SRS And DOE Documents/Reports:**

Mills, G.L. and J.C. Seaman. 2000. Laboratory analysis for monitored natural attenuation (MNA) samples: Volatile Chlorinated Organic Compounds (Summary Report) Submitted to SRS Bechtel-ER September 26, 2000.

Seaman, J.C., and G. Mills. 2000. Laboratory analysis for monitored natural attenuation (MNA) samples: Anion and DOC results (Summary Report) Submitted to SRS Bechtel-ER September 26, 2000.

**RECENT PRESENTATIONS AT PROFESSIONAL MEETINGS:**

Characterization of biodegradation rates of separated diesel components. [with J.J. Olson, B. Herbert, and P. Morris] 213<sup>th</sup> National Meeting of the American Chemical Society, San Francisco, CA, April 1997.

Enhanced degradation of tetrachloroethylene by redox manipulated iron-bearing clays and aquifer material. [with R.M. Castillo, V.A. Nzengung, and W. Gates] 213<sup>th</sup> National Meeting of the American Chemical Society, San Francisco, CA, April 1997.

Mills, G.L. Lipid Composition of Suspended Particulate Organic Matter in Coastal Plain Blackwater Tributaries of the Savannah River. Symposium on Impacts of Human Activities in the Savannah River Basin, Society of Environmental Toxicology and Chemistry 19<sup>th</sup> Annual Meeting, November 1998.

Effects of Carbon Quality on the Transport of PAHs in Low Carbon Aquifer Sediments, [with M.A. Garrett, D.E. Radcliffe, J. J. Olson, and B.E. Herbert] Symposium on the Biogeochemistry of Aromatic Hydrocarbons, American Chemical Society 215<sup>th</sup> national Meeting, April 1998.

Characterization of Biodegradation Rates of Separated Diesel Components, [with J.J. Olsen, B.E. Herbert, and P. Morris] 213<sup>th</sup> Meeting of the American Chemical Society, April 1997.

Enhanced Degradation of TCE by Redox Manipulated Iron-bearing Clays and Aquifer Material. [with R. Castillo, V. Nzengung, and W. Gates] 213<sup>th</sup> Meeting of the American Chemical Society, April 1997.

Enhanced Degradation of Chlorinated DNAPL Contaminants Using Redox-Manipulated Aquifer Material and Iron-Bearing Clays, [with V. Nzengung] Third Annual Strategic Environmental Research and Development Program (SERDP) Symposium, December, 1997.

Degradation of PCE Contaminated Groundwater in Chemically-Reduced Aquifer Material, 20<sup>th</sup> Annual Meeting of the Society of Environmental Toxicology and Chemistry, November 1999. (Poster)

Effects of Carbon Quality on the Transport of PAHs in Low Carbon Aquifer Sediments. 20<sup>th</sup> Annual Meeting of the Society of Environmental Toxicology and Chemistry, November 1999.

Preliminary results of wetlands natural attenuation monitoring for TCE at the Savannah River Site. B.E. Hart, J. Ross, G. Rucker. P. Albanesious, J. Nelsen, G.L. Mills, and J.B. Williams. 12<sup>th</sup> Technical Information Exchange Workshop, Augusta GA, November 13-14, 2000.

Utility of diffusion samplers for the characterization of media containing TCE. B.E. Hart, G.L. Mills, and J.B. Williams. 9<sup>th</sup> Annual Meeting of Carolinas Regional Chapter of Society of Environmental Toxicology and Chemistry, Wilmington, NC, March 32-April 1, 2000.

Uddin, M.K., G.L. Mills, J.C. Seaman, and V.A. Nzengung. Degradation of PCE using chemically reduced sediments. Annual ASA Meetings, November 5-9, 2000, Minneapolis.

Detection and quantification of tri- and diethylphosphate by atmospheric pressure chemical ionization Fourier-transform

mass spectrometry (APCI-FTMS). P. R. Nuessle and G.L. Mills. Society of Environmental Toxicology, 21<sup>st</sup> Annual Meeting, Nashville, TN, November 12-16, 2000.

### **RECENT INVITED SEMINARS AND LECTURES:**

Mills, G.L., V.A. Nzengung, S.K. Hayden, P.R. Nuessle, and M Uddin. Degradation of PCE contaminated groundwater in chemically reduced aquifer material. Bouyoucos Conference on Environmental Chemistry at the Clay-Water Interface, Honolulu, Hawaii, March 6-9, 2000.

Mills, G.L. Bioremediation of Diesel Hydrocarbons in Contaminated Soils. Department of Biology and Geology, University of South Carolina-Aiken, February 17, 2000.

Mills, G.L. Effects of Triethyl Phosphate on the Biodegradation of Diesel Contaminants in Aquifer Substrates. EPA Narragansett Marine Laboratory and Graduate School of Oceanography, University of Rhode Island. October 19, 2000.

### **GRANTS:**

#### **DOE Funded**

Mills, G.L. Bioremediation of Petroleum Hydrocarbons and Chlorinated Hydrocarbon Contaminated Soils: Analysis of Soil and Gases for Contaminants, Intermediates, Metabolic Inducers, and Gaseous Nutrients. Funded by WSRC-SRTC through an MPO. March 1997 - November 1997 (\$18,018).

Seaman, J.C. and G.L. Mills. Analysis of Arsenic, Cadmium, Chromium, Copper, Lead, Zinc, and Aroclor-1254 by Small Mammals and Earthworms at the A-Area Rubble Pile. July 1998 - January 1999 (\$39,456).

Water Analyses in Support of Monitored Natural Attenuation of TCE at the C-Area Burning Rubble Pits, G. Mills and J.C. Seaman. July – June, 1999, WSRC-ER (\$12,025).

Enhanced Degradation of Halogenated Organic Contaminants Using Redox-Manipulated Aquifer Sediments and Iron-Bearing Clays, Mills, G.L., V.A. Nzengung, and W.P. Gates. Funded by DOE -National Water Research Center. April 1997 - June 31, 2001 (\$480,963/ 4 yrs.).

Analysis of PCE and degradation products in groundwater samples from C-Area Twin Lakes, Mills, G.L. South Carolina State University/ DOE-HBCU Project with John Williams (\$5,527).

Analysis of PCE and degradation products in soil gas and groundwater samples from C-Area Burning Rubble Pits, G.L. Mills and J Vaun McArthur WSRC –ER , July 2000 – June 2001 (\$24,000).

Determination of contaminant burdens and DNA strand-breakage in clapper rails inhabiting the Troup creek and LCP salt marsh systems, Brunswick, Georgia. K.F. Gaines, W.L. Stephens, Jr., T.C. Glenn, J.M. Novak, G.L. Mills, and I.L. Brisbin, Jr.. U.S. Fish and Wildlife Service (\$56,324 1 yr.; Mills \$24,000)

TNX Toxicity Study: LC-FT-MS of organics. G.L. Mills and P.R. Nuessle. WSRC-SRTC (\$2,000).

Colloid Suspension Characterization: FT-ICR-MS analysis of organic acids associated with high level waste processing. P. R. Nuessle and G.L. Mills, WSRC (\$6,400).

Analysis of TCE, DCE, vinyl chloride and trichloroacetic acid in vegetation samples associated with the phytoremediation of a TCE-contaminated groundwater plume. G.L. Mills. ER/SREL (\$10,200).

Analysis of PCE and degradation products in groundwater samples from C-Area CMP-pits plume. May – September 2001, Mills, G.L. South Carolina State University/ DOE-HBCU Project with John Williams/ ER (\$6,800).

## **Submitted:**

An assessment of the natural attenuation capacity for remediating PCE and TCE in the seep zones associated with the CBRP contaminant plume. G. Mills, J.C. Seaman, JV McArthur, and T. Punshon DOE-SR ERD, February 2001 – September 2001 (\$44,800); October 2001 – September 2002, (\$62,400).

## **NON-DOE Funded**

Determination of contaminant burdens and DNA Strand-breakage in Clapper Rails inhabiting Blythe Island, Georgia, K.F. Gaines, W.L. Stephens, Jr., G.L. Mills, B. Jackson, and I. L. Brisbin, Jr. U.S. Fish and Wildlife Service, February 2001 – September 30 2001 (\$40,291).

Determination of contaminant burdens in Clapper Rails chicks inhabiting Blythe Island, Georgia, K.F. Gaines, W.L. Stephens, Jr., G.L. Mills, B. Jackson, and I. L. Brisbin, Jr. U.S. Fish and Wildlife Service, March 2001 –March 30 2002 (\$32,000).

## **GRADUATE STUDENT SUPERVISION:**

Committee member for Charles V. Shorten, Ph.D., (1989) Department of Environmental Systems Engineering at Clemson University. Dissertation “Desorption of selected polycyclic aromatic hydrocarbons in coal contaminated sediments.”

Committee member for Patricia Mahaney, M.S. (1992) Zoology Department at the University of Georgia. Thesis “The effects of freshwater petroleum contamination on amphibian reproduction”.

Committee member for Barry Dalton, Ph.D., (1993) Botany Department at North Carolina State University. A portion of his research was conducted in my laboratory. Dissertation “Phenolic acids in the soils of a bottomland deciduous forest.”

Committee member for John Seaman, Ph.D., (1995) Department of Crop and Soil Sciences at the University of Georgia. Dissertation “Chemical controls on colloid generation and transport in a sandy aquifer”.

Coadvisor for Rondall Hudson, M.S., (1994) Department of Geology and Geophysics at Texas A&M University. Thesis “Weathered diesel oil as a sorptive phase for hydrophobic organic compounds in aquifer materials”.

Committee member for Alfredo Lopez, M.S., (1995) Department of Crop and Soil Environmental Sciences, Virginia Polytechnic and State University. Thesis “ Biodegradability of dicamba and 2,4-D in riparian wetland soils”.

Co-advisor for Ms. Pamela Schultz, M.S. (1996) Department of Environmental Systems Engineering, Clemson University. Thesis “Partitioning of soil lipids between particulate, colloidal, and dissolved fractions”

Co-advisor for Ms. Jennifer Olsen, M.S. (1997) Department of Geology, Texas A&M University. Thesis: “Characterization of biodegradation rates of separated diesel components”.

Co-advisor for Mr. Michael Garrett, M.S. (1997) Department of Crop and Soil Sciences, University of Georgia. Thesis “ Interactions between hydrophobic organic compounds and a low-carbon aquifer material treated with natural organic compounds”.

Committee member for Mr. Brian Jackson, Ph.D. (1998) Crop and Soil Sciences, University of Georgia.

Committee member for Ms. Tara Oates, M.S. (1998) Department of Geology, University of Georgia. Thesis: “Sorption of halogenated aromatic chemicals by single and dual cation organo-modified montmorillonites”.

Co-Advisor for Ms. Reyna Castillo, M.S. (1998) Department of Geology, University of Georgia. Thesis: “Enhanced anaerobic degradation of tetrachloroethylene by redox-manipulated iron-bearing clays”.

Committee member for Mr. Bryan Heath, M.S. (1999) Department of Geology, University of Georgia. Thesis: “Investigation of effectiveness dithionite reduced aquifer materials in the degradation of chlorinated aliphatics”.

Co-Advisor for Ms. Heather Lott, M.S. (1999) Department of Geology, Texas A&M University. Thesis: “The effect of triethylphosphate on the biodegradation of diesel fuel”.

Co-Advisor for Mr. Patterson Nuessle, M.S. (2000) Department of Crop and Soil Sciences. Thesis: “Sorption and biotransformation of triethyl phosphate”.

Co-Advisor for Mr. Momin Uddin, Ph.D. candidate, Department of Geology, University of Georgia. Thesis: “ Reactions and transport of PCE and TCE in aquifer sediments of the Southeastern Coastal Plain”.

**SUPERVISION OF SUMMER UNDERGRADUATE STUDENT RESEARCH PROJECTS AT SREL:**

Ms. Linda Hubbard, Barnard College, Columbia University

Mr. Brian Pruka, Iowa State University

Mr. Michael DeFelippis, Fairleigh Dickinson University

Ms. Beverly Bohlman, University of South Dakota

Ms. Pamela Schultz, Providence College

Mr. R. Dean Prescott, Chemical Engineering, University of South Carolina.

Ms. Michelle Bieniek, U. of California at San Diego.

Mr. David Giddings, Rhodes College, Tennessee.

Mr. Hassan Pressly, Clemson University.