

CIVIL, CONSTRUCTION, AND ENVIRONMENTAL ENGINEERING

OREGON STATE UNIVERSITY

College of Engineering

WILLIAMSON, Kenneth J.

Professor & Head

BIRTH DATE

April 27, 1946

DEGREES

B.S., Civil Engineering, Oregon State University, 1968

M.S., Environmental Engineering, Oregon State University, 1970

Ph.D., Environmental Engineering, Stanford University, 1973

ACADEMIC POSITIONS

Instructor, Oregon State University, 1969-1970

Instructor, San Jose State University, 1971-1972

Assistant Professor, Oregon State University, 1973-1978

Associate Professor, Oregon State University, 1978-1985

Professor, Oregon State University, 1985-present

Associate Director, Western Region Hazardous Substance Research Center, Oregon State University, 1989-present

Director, Training and Technology Transfer, Western Region Hazardous Substance Research Center, Oregon State University, 1989-present

Director, Technical Outreach Service to Community Program, Western Region Hazardous Substance Research Center, Oregon State University, 1994-present

Director, Oregon Water Resources Research Institute, 1993-1999

President, Oregon State University Faculty Senate, 1999

Head, Department of Civil, Construction, and Environmental Engineering, 2000-present

Co-Director, Center for Water and Environmental Sustainability, 2000-present

FIELDS OF SPECIALIZATION

Biological and Chemical Waste Treatment

Environmental Impact Assessment

Hazardous Waste Treatment and Management

Bioremediation

Technology Transfer and Technical Outreach

PROFESSIONAL ACTIVITIES

Registration

Professional Engineer, State of Oregon

Professional Societies

American Society of Civil Engineers

American Water Works Association

Water Pollution Control Federation

Association of Environmental Engineering Professors

American Society of Engineering Education

Patents

- “Method and Apparatus for Separating Suspended Solids from Liquids,” U.S. Patent 4,743,382
“Submerged Aerated Biofilm Reactor,” U.S. Patent 5,116,506

Professional Recognition

- Tau Beta Pi
Harrison P. Eddy Award for Most Significant Contribution to Environmental Engineering Research - 1977
NSF Postdoctoral Fellowship, 1978-1979
Austin-Paul University Faculty Award for excellence in student/teacher relationship, 1986
Dar Reese All-University Advising Award for excellence in academic advising, 1987
Founders Award (outstanding paper in *Water Research* for 1989), USA National Committee, International Association of Water Pollution Research and Control, 1990
Alumni Award, Oregon State University, 1997

Committees, Commissions, and Boards

- Education Committee, Pacific Northwest Pollution Control Association, 1975, 1976
Research Committee, Pacific Northwest Pollution Control Association, 1977-Present
Chairman, National ASCE Task Committee on Physical and Biological Transformations of Estuaries, 1975-1978
Board of Directors, Water Resources Research Institute, Oregon State University, 1976-1978, 1983
Advisory Committee, Benton County Health Department, 1977-1979
Board of Directors, Oregon Chapter, ASCE, 1978-1979
Advisory Committee on Water, Board of Health, State of Oregon, 1981-1984
Committee on Corrosion Control, American Water Works Association, 1982-1985
Board of Directors, Association of Environmental Engineering Professors, 1989-1992

PUBLICATIONS

Books

- “Fish and Shellfish Wastes,” (with M.R. Soderquist), in *Solid Wastes* (C.L. Mantell, ed.) John Wiley and Sons, New York, NY, 1975.
“The Use of Fish and Shellfish Waste in Fertilizers and Feedstuffs,” (with G.R. Swanson and E.G. Dudley), in *Handbook of Organic Waste Conversion* (M.W.M. Bewick, ed.), Van Nostrand Reinhold, New York, NY 1979.
“Water Treatment and Distribution,” in *Civil Engineering License Review*, 12th Edition, Engineering Press, San Jose, CA, 1995.
“Water Treatment and Distribution: Problems and Solutions,” in *Civil Engineering License Problems and Solutions*, 12th Edition, Engineering Press, San Jose, CA, 1995.
“Wastewater Treatment,” in *Civil Engineering License Review*, 12th Edition, Engineering Press, San Jose, CA, 1995.
“Wastewater Treatment: Problems and Solutions,” in *Civil Engineering License Problems and Solutions*, 12th Edition, Engineering Press, San Jose, CA, 1995.
“Waste Water and Solid Waste Treatment,” in *EIT Civil Review*, Engineering Press, San Jose, CA, 1997.
“Water Purification and Treatment,” in *EIT Civil Review*, Engineering Press, San Jose, CA, 1997.

Refereed Technical Journals and Proceedings

- “Rapid Measurement of Monod Half-Velocity Coefficients for Bacterial Kinetics,” (with P.L. McCarty), *Bioengineering and Biotechnology*, XVII, 915, 1975.
- “A Model of Substrate Utilization by Bacterial Films,” (with P.L. McCarty), *J. of Water Poll. Control Federation*, 48, 1, 1976.
- “Verification Studies of the Biofilm Model for Bacterial Substrate Utilization,” (with P.L. McCarty), *J. of Water Pollution Control Federation*, 48, 1, 1976.
- “Conflicts in Interdisciplinary Research,” (with D.A. Bella), *J. of Environmental Systems*, 6, 2, 105, 1976-1977.
- “Influence of Interdisciplinary Research on Environmental Management,” (with D.A. Bella), *Engineering Issues, ASCE*, 105, EI3, 193, 1978.
- “Setting Rates of Algae from Wastewater Lagoons,” (with S.E. Stutz McDonald), *J. Environmental Engineering, ASCE*, 105, 2, 273, 1978.
- “Input/Output Energy Analyses of Regional Water Pollution Control,” (with R.J. Heggen), *J. of Water Pollution Control Federation*, 51, 4, 759, 1979.
- “Diagnosis of Chronic Impacts of Estuarine Dredging,” (with D.A. Bella), *J. Environmental Systems*, 9, 4, 1979-80.
- “Kinetics of Trace Metal Partitioning in Model Anoxic Marine Sediments,” (with S. Oakley, C. Delphey and P.O. Nelson), *Water Research*, 14, 1067, 1980.
- “Upgrading Lagoon Effluents with Rock Filters,” (with G.R. Swanson), *J. of Environmental Engineering, ASCE*, 106, 6, 1111, 1980.
- “Estuarine Sediments: Successional Model,” *J. of Environmental Engineering, ASCE*, 106, 4, 695, 1980.
- “Simulation of Sulfur Cycle in Estuarine Sediments,” (with D.A. Bella), *J. of Environmental Engineering, ASCE*, 106, 1, 125, 1980.
- “Influence of Dissolved Oxygen on Activated Sludge Viability,” (with P.O. Nelson), *J. Water Pollution Control Federation*, 53, 1541, 1981.
- “A Bacterial Bioassay for Assessment of Wastewater Toxicity,” *Water Research*, 15, 3, 383, 1981.
- “Packed Bed Biofilm Reactors: Simplified Model,” (with A.D. Meunier), *J. Environmental Engineering Division, ASME*, 107, 307, 1981.
- “Packed Bed Biofilm Reactors: Design,” (with A.D. Meunier), *J. Environmental Engineering Division, ASCE*, 107, 319, 1981.
- “Influence of Dissolved Oxygen on Substrate Utilization Kinetics of Activated Sludge,” (with M.F. Knudson and P.O. Nelson), *J. Water Pollution Control Federation*, 54, 52, 1981.
- “Model of Trace Metal Partitioning on Marine Sediments,” (with S.N. Oakley and P.O. Nelson), *Environmental Science and Technology*, 15, 4, 474, 1981.
- “Partitioning of Trace Organics in Sediments,” (with D.P. Pierce and P.O. Nelson), *J. of Environmental Engineering Division, ASCE*, 107, 1100, 1981.
- “Teaching Holistic Thought Through Engineering Design,” (with R.T. Hudspeth), *Engineering Education*, 698, April, 1982.
- “Bacterial Toxicity and Metabolism of Hydrazine Fuels,” (with D.A. Kane), *Archives of Environmental Contamination and Toxicology*, 12, 447, 1983.
- “Accumulation of Cadmium by *Abarenicola Pacifica*,” (with S.N. Oakley, P.O. Nelson), *J. of Science of the Total Environment*, 28, 105, 1983.
- “Dissolved Oxygen Limitations in Activated Sludge: Laboratory Studies,” (with G.R. Swanson and P.O. Nelson) Accepted by *J. Water Pollution Control Federation*, 1983.
- “Adsorption of Cadmium and Copper by Estuarine Sediments,” (with R.J. Davies-Colley and P.O. Nelson), *Environmental Science and Technology*, 18, 7, 491, 1983.

- “Sulfide Control of Cadmium and Copper Concentration in Anaerobic Estuarine Sediments,” (with R.J. Davies-Colley and P.O. Nelson), *Marine Chemistry*, 16, 173-186, 1985.
- “Conflicts in Interdisciplinary Research,” (with D.A. Bella), *Interdisciplinary Analysis and Research*, 1986.
- “Evidence for Off-Site Transport of Dioxin and Furan Residues in Oregon Sawmills Using Chlorophenol Wood Preservatives,” (with M. Hackett and S. Woods), American Chemical Society, Division of Environmental Chemistry, 191st National Meeting, Vol. 26, No. 1, New York, NY, April 13-18, 1986.
- “Combined Aerobic Heterotrophic Oxidation, Nitrification, and Denitrification in a Permeable Supported Biofilm,” (with D. Timberlake and S.E. Strand), *Water Research*, 22, 12, 1513, 1988.
- “Polychlorinated Bibenzo-p-Dioxins and Dibenzofurans in Selected Estuarine Sediments,” *Chemosphere*, 1989.
- “Implementation of the Kolb Learning Style Theory in a Faculty Development Program at Brigham Young University,” (with R.E. Terry, S.O. Durrant, and P.K. Hurt), Proceedings of 1991 ASEE Annual Conference, 1991.
- “Remediation of Kuwait’s Oil Contaminated Soils,” (with N. M. Al-Awadhi, and J.D. Istok) Chapter 2 in *Hydrocarbon Contaminated Soils*, Vol. III, Lewis Publishers, 1993.
- “Clean-up of Kuwait’s Soils,” (with N. M. Al-Awadhi), *Soils*, March, 1993.
- “Cometabolic Degradation of Chlorinated Solvents: Bacterial Inhibition, Inactivation, and Recovery,” (with R.L. Ely, M.R. Hyman, and D.J. Arp), Proceedings of Third International Conference on Bioremediation, 1995.
- “A Cometabolic Kinetics Model Incorporating Enzyme Inhibition, Inactivation, and Recovery. 1. Model Development, Analysis, and Testing,” (with R.L. Ely, R.B. Guenther, M.R. Hyman, and D.J. Arp), *Bioengineering and Biotechnology*, 46, 3, 218-231, 1995.
- “A Cometabolic Kinetics Model Incorporating Enzyme Inhibition, Inactivation, and Recovery. 2. Trichloroethylene Degradation Experiments,” (with R.L. Ely, R.B. Guenther, M.R. Hyman, and D.J. Arp), *Bioengineering and Biotechnology*, 46, 3, 232-245, 1995.
- “Cometabolism of Trichloroethylene by *Nitrosomonas europaea*: Inhibition, Inactivation and Recovery of Ammonia-Oxidizing Activity,” (with M.R. Hyman, S.A. Russell, R.L. Ely, and D.J. Arp), *Journal of Applied Microbiology*, 1995.
- “Dioxin and Furan Emissions from Municipal Refuse Derived Fuel Combustion,” (with T.J. Lee and Y. Lee), *J. of Korean Environmental Engineering Association*, 1995.
- “Metal Emission from RDH Combustion,” (with T.J. Lee and Y. Lee), *J. of Air Pollution Conservation*, 1995.
- “Trinitrotoluene (TNT) Transformation Pathways under Denitrification Conditions by Ruminal Microorganisms G.8,” (with T.J. Lee, A.M. Craig, and S.L. Woods), *Applied and Environmental Microbiology*, 1995.
- “Inhibition, Inactivation, and Recovery of Ammonia-Oxidizing Activity in Cometabolism of Trichloroethylene by *Nitrosomonas europaea*,” (with M.R. Hyman, S.A. Russell, and R.L. Ely), *Applied and Environmental Microbiology*, 61, 1480, 1995.
- “Cometabolic Degradation of Chlorinated Solvents: Bacterial Inhibition, Inactivation and Recovery,” (with R.L. Ely, M.R. Hyman, and D.J. Arp), in *Bioremediation of Chlorinated Solvents* (R.E. Hinchee, A. Leeson, and L. Semprini, eds.), 187, 1995.
- “Adsorption of Chlorinated Phenols to Activated Carbon,” (with M. Yang and P.O. Nelson), submitted to Environmental Engineering Division, ASCE, 1996.
- “Cometabolism of Chlorinated Solvents by Nitrifying Bacteria: Kinetics, Substrate Interactions, and Toxicity Effects and Bacterial Response,” (with R.L. Ely, M.R. Hyman, and D.J. Arp), *Biotechnology and Bioengineering*, 54, 520-534, 1997.

- “The Anaerobic Transformation of TNT and Other Nitroaromatic Compounds,” (with J.B. Lotrario, S.L. Woods, and A.M. Craig), *In-Situ and On-Site Bioremediation*, Volume 2, Fourth International In-Situ and On-Site Bioremediation Symposium, Battelle Press, 41, 1997.
- “Bioremediation of Pentachlorophenol-Contaminated Groundwater: A Permeable Barrier Technology,” (with J.D. Cole, S.L. Woods, P.J. Kaslik, and D.B. Roberts), *In-Situ and On-Site Bioremediation*, Volume 2, Fourth International In-Situ and On-Site Bioremediation Symposium, Battelle Press, 239, 1997.
- “Bioremediation of Soils Contaminated with 2,4-D, 2,4,5-T, Dichloroprop, and Silvex,” (with A.B. Degher, K.G. Wang, S.L. Woods, and R. Strauss), *In-Situ and On-Site Bioremediation*, Volume 2, Fourth International In-Situ and On-Site Bioremediation Symposium, Battelle Press, 279, 1997.
- “Bioremediation of Pentachlorophenol-Contaminated Soil in Laboratory and Full-Scale Processes,” (with M.B. Havighorst and S.L. Woods), *In-Situ and On-Site Bioremediation*, Volume 2, Fourth International In-Situ and On-Site Bioremediation Symposium, Battelle Press, 455, 1997.
- “Cometabolism of MTBE by Alkane-Utilizing Microorganisms,” (with M.R. Hyman, P. Kwon, and K.T. O-Reilly), *Proceedings*, 1st International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Battelle Presse, Columbus, OH, 1998.
- “Cometabolic Degradation of PAHs Using Phenol-Oxidizing Bacteria,” (with S. Chang and M.R. Hyman), 1998 Joint Conference on the Environment, WERC-WRHSRC-NMHWMS, Crowne Plaza Pyramid, Albuquerque, NM, March 31-April 1, 1998, pp. 47-52.
- “Anaerobic Treatment of a Pentachlorophenol-Contaminated Aquifer Using a Borehole Reactor,” (with J. Cole, S.L. Woods, and D. Roberts), 1998 Joint Conference on the Environment, WERC-WRHSRC-NMHWMS, Crowne Plaza Pyramid, Albuquerque, NM, March 31-April 1, 1998, pp. 57-62.
- “Cometabolism of MTBE by Alkane Utilizing Organisms,” (with M.R. Hyman, T. Musafika-Jeknic, P. Kwon, and K. Reilly), 1998 Joint Conference on the Environment, WERC-WRHSRC-NMHWMS, Crowne Plaza Pyramid, Albuquerque, NM, March 31-April 1, 1998, pp.197-204.
- “Nitrifying Bacteria as “Priming” Catalysts for the Biodegradation of Xenobiotics,” (with S. Chang and M.R. Hyman), *Designing and Applying Treatment Technologies* (Godage B. Wickramanayake and Robert F. Hinchee, eds.), First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 18-21, 1998, 1(3):51.
- “Transformation of TCE Driven by Organo-Silicon Compounds,” (with S. Vancheeswaran, L. Semprini, G. Pon, and J.D. Ingle), *Designing and Applying Treatment Technologies* (Godage B. Wickramanayake and Robert F. Hinchee, eds.), First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 18-21, 1998, 1(3):57.
- “Demonstration of a Permeable Barrier Technology for Pentachlorophenol-Contaminated Groundwater,” (with J.D. Cole, S.L. Woods, and D. Roberts), *Designing and Applying Treatment Technologies* (Godage B. Wickramanayake and Robert F. Hinchee, eds.), First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 18-21, 1998, 1(3):121-126, 1998.
- “Bioremediation of Soils Containing 2,4-C, 2,4,5-T, Dichloroprop, and Silvex,” (with J.T. Spadar, E.L. Webb, H. Schmid, and A. Degher), *Designing and Applying Treatment Technologies* (Godage B. Wickramanayake and Robert F. Hinchee, eds.), First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 18-21, 1998, 1(3):183.
- “Cometabolism of MTBE by Alkane-Utilizing Microorganisms,” (with M.R. Hyman, P. Kwon, and K. Reilly), *Designing and Applying Treatment Technologies* (Godage B. Wickramanayake and

- Robert F. Hinchee, eds.), First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 18-21, 1998, 1(6):321-326, 1998.
- “Abiotic and Biological Transformation of Tetraalkoxysilanes and Trichlorethene/cis-1,2-Dichloroethen Cometabolism Driven by Tetrabutoxysilane-Degrading Micororganisms,” (with S. Vancheeswaran, R.U. Haldne, J.D. Ingle, and L. Semprini), *Environ. Sci. Technol.*, 33:1077-1085, 1999.
- “Environmental Fate and Toxicity of Creosote Pressure Treated Wood Leachates. Part I. Molecular Marker Identification and Chemodynamics,” (with T. Aboul-Kassim, P. Thayumanavan, and B. Simoneit), The Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC) – Environmental Assessment in California: Common Challenges for the 21st Century, April 25-27, 1999, Concord, CA, pp. 35.
- “Environmental Fate and Toxicity of Creosote Pressure Treated Wood Leachates. Part II. Ecological Risk and Human Health Assessments,” (with T. Aboul-Kassim, P. Thayumanavan, and B. Simoneit), The Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC) – Environmental Assessment in California: Common Challenges for the 21st Century, April 25-27, 1999, Concord, CA, pp. 58.
- “Environmental Fate and Toxicity Modeling of Solid Waste Materials,” (with T. Aboul-Kassim and B. Simoneit), The Air and Waste Management Association 92nd Annual Meeting and Exhibition, St. Louis, MO, June 20-24, 1999.
- “Predictive Models for Environmental Chemodynamics of Organic Leachates from Complex Mixtures. Part I. “ENVIRO-CHEM-COMs” Project,” (with T. Aboul-Kassim and B. Simoneit), *CRC – Critical Reviews in Environmental Science and Technology*, submitted 2000.
- “Environmental Chemodynamics of Organic Leachates from Complex Mixtures. Part II. A Review of the Project Approaches,” (with T. Aboul-Kassim and B. Simoneit), *CRC – Critical Reviews in Environmental Science and Technology*, submitted 2000.
- “Predictive Models for Environmental Chemodynamics of Organic Leachates from Complex Mixtures. Part III. Molecular Marker Characterization and Source Partitioning Model,” (with T. Aboul-Kassim and B. Simoneit), *Environ. Sci. Technol.*, submitted 2000.
- “Predictive Models for Environmental Chemodynamics of Organic Leachates from Complex Mixtures. IV. Fate-Transport Modeling,” (with T. Aboul-Kassim and B. Simoneit), *CRC – Critical Reviews in Environmental Science and Technology*, submitted 2000.
- “Predictive Models for Environmental Chemodynamics of Organic Leachates from Complex Mixtures. V. Modeling the Joint Toxic Effect of Multicomponent PAH Mixtures,” (with T. Aboul-Kassim and B. Simoneit), *Environ. Sci. Technol.*, submitted 2000.
- “Predictive Models for Environmental Chemodynamics of Organic Leachates from Complex Mixtures. Part VI. ΣPAH Model for Fresh Water Algal Toxicity Estimation,” (with T. Aboul-Kassim and B. Simoneit), *Environ. Sci. Technol.*, submitted 2000.

Non-Refereed Conference Proceedings

- “Seafood Processing: Pollution Problems and Guidelines for Improvement,” (with M.R. Soderquist and G.I Blanton), Proceedings of the National Symposium of Food Processing Wastes, Portland, OR, April 1970.
- “Monitoring Dredge Spoils,” (with L.S. Slotta), Proceedings of EPA Workshop of Monitoring the Marine Environments, 1974.
- “Oxidation of Ferrous Sulfides in Estuarine Sediments,” (with A. Todd), Proceedings of 1976 Technical Conference on the Estuaries of the Pacific Northwest, March 1976.
- “Oxygen Limitation in Heterotrophic Biofilms,” (with D. Owen), 31st Purdue Industrial Waste Conference, May 1976.

- “Environmental Trade-offs of Land vs Water Storage of Logs,” (with F.D. Schaumburg), Log Sort Yards Conference, Oregon State University, 1977.
- “Environmental Impacts of Dredging in Estuaries,” (with D.A. Bella), Proceedings of Shorelines Management ‘77: Performance & Prospects, Seattle, WA, September 1977.
- “A Diagnostic Methodology for Assessment of Environmental Impacts in Estuaries,” Proceedings of Coastal Zone ‘78, March 1978.
- “Field Evaluation of Rock Filters for Removal of Algae from Lagoon Effluents,” Proceedings of Conference on Upgrading Lagoon Effluents, Logan, UT, August 1978.
- “Influence of Dissolved Oxygen Concentrations on Viability and Kinetics of Activated Sludge,” Research Symposia Proceedings of Water Pollution Control Federation Conference, Las Vegas, NV, October 1980.
- “Use of Aerated Support Biofilm for Treatment of Municipal Wastewaters,” Annual Conference of the Environmental Engineering Division, ASCE, 1987.
- “Development of a Novel Support Biofilm Reactor for the Biodegradation of Toxic Organic Compounds,” (with S. Woods, S. Strand, K. Ryan, J. jPolonsky, R. Ely, K. Gardner, and P. Defarges,” Fourteenth Annual Research Symposium, Land Disposal, Remedial Action, Incineration and Treatment of Hazardous Waste, US Environmental Protection Agency, EPA/600/9-88/021, USEPA Risk Reduction Engineering Laboratory, Cincinnati, OH, July 1988.
- “Degradation of Chlorinated Low Molecular Weight Solvents by an Enrichment Culture of Methanotrophs,” (with S. Strand, S. Woods, and K. Ryan), Fifteenth Annual Research Symposium, Land Disposal, Remedial Action, Incineration and Treatment of Hazardous Wastes, Environmental Protection Agency, Cincinnati, OH, 1989.
- “Wood Waste,” Handbook on Puget Sound Sediments, A Briefing on Puget Sound Sediments, June 9, 1989.
- “Program to Improve Teaching and Learning in the College of Engineering and Technology at Brigham Young University,” 1990 Frontiers in Education Meeting, Vienna, Austria, July 1990.

Reports and Others

- “A Study of the Quantity and Distribution of Bark Debris Resulting from Log Rafting,” M.S. Thesis, Oregon State University, 1970.
- “Water Pollution Abatement in the U.S. Seafoods Industry,” (with M.R. Soderquist, G.I. Blanton, D.C. Phillips, D.L. Crawford and D.K. Law), Pacific Northwest Water Laboratories, FWQA, USDI, Corvallis, OR, 1971.
- “The Kinetics of Substrate Utilization by Bacterial Films,” Ph.D. Thesis, Stanford University, 1973.
- “Effects of Shoal Removal by Propeller Wash, December 1973, Tillamook Bay, OR,” (with L.S. Slotta, D.R. Hancock and C.K. Sollitt), U.S. Army Corps of Engineers, 1974.
- “Dredging Problems and Complications,” (with L.S. Slotta), Coastal Zone Management Problems, SEMN WR 018-74, Water Resources Research Institute, Oregon State University, pp. 39-52, March 1974.
- “Estuarine Impacts Related to Dredge Spoiling,” (with L.S. Slotta), Proceedings of the Sixth Dredging Seminar at Texas A & M University, College Station, TX, 1974.
- “An Examination of Some Physical and Biological Impacts of Dredging in Estuaries,” (with L.S. Slotta, D.A. Bella, D.R. Hancock, J.E. McCauley, C.K. Sollitt, and J.M. Stander), Interim Progress Report Submitted to NSF-RANN, 1974.
- “Monitoring Methods for Estuarine Benthic Systems,” (with D.A. Bella), Bulletin No. 52, Engineering Experiment Station, Oregon State University, Corvallis, OR, September 1975.
- “Mutual Influence of Interdisciplinary Research and Environmental Management,” (with D.A. Bella), EPA Conference on Interdisciplinary Research, Spokane, WA, February 1975.

- “A Bioassay to Assess Wastewater Toxicity of Aerobic Biological Treatment,” Water Resources Institute, Oregon State University, 1976.
- “Review of Environmental Impact Statements for Dredging in Estuaries: A Guides Manual,” (with others), Oregon State University, 1977.
- “Review of Environmental Impact Statements for Dredging in Estuaries: A Technical Manual,” (with others), Oregon State University, 1977.
- “Environmental Impacts of Dredging in Estuaries,” (with others), Final Project Report Submitted to NSF-RANN, 1977.
- “Input/Output Energy Analyses of Regional Water Pollution Control,” (with R.J. Heggen), Final Project Report Submitted to Environmental Protection Agency, 1978.
- “Rock Filters for Upgrading Lagoon Effluents,” (with G.R. Swanson), Final Project Report Submitted to Environmental Protection Agency, 1979.
- “Uptake of Metals by Benthic Influence,” (with S. Oakley and P.O. Nelson), Final Report Submitted to WRRI, Oregon State University, 1981.
- “A Bacterial Bioassay for Level I Assessment of Wastewaters,” Final Report Submitted to EPA, CERL, Corvallis, OR, 1982.
- “Intragastric Administration of Dibromomethane to Rats,” Final Report, Air Force Office of Scientific Research, 1983.
- “Environmental Assessment of Wood Fuel Storage for a Biomass Powered, Combined Cycle Generation Facility,” USDA, Final Report, 1986.
- “Health and Safety Considerations for a Biomass Powered, Combined Cycle Power Generation Facility,” USDA, Final Report, 1986.
- “Water Requirements and Wastewater Generation for a Biomass Powered, Combined-Cycle Power Generation Facility, USDA, Final Report, 1986.
- “Teaching Through the Cycle,” Chemical Engineering Department, Brigham Young University,” 1990.
- “Annual Report for the Oregon Water Resources Research Institute,” Submitted to USGS, 1993.
- “Annual Report for the Oregon Water Resources Research Institute,” Submitted to USGS, 1994.
- “Degradation of Chlorinated Aliphatic Compounds by Nitrifying Bacteria,” Final Report to WRHSRC, 1994.
- “Effect of Construction and Repair Materials on Surface and Ground Waters,” Project 9-25 (Phase I), (with W.C. Huber, N. Eldin, J. Greene, and J. Lundy), Interim Report to National Research Council, NCHRP, May 1994.
- “Annual Report for the Oregon Water Resources Research Institute,” Submitted to USGS, 1995.
- “Gravel Disturbance Impacts on Salmon Habitat and Stream Health, Volume I: Summary,” OWRRI, April 1995.
- “Gravel Disturbance Impacts on Salmon Habitat and Stream Health, Volume II: Technical Background,” OWRRI, April 1995.
- “Effect of Construction and Repair Materials on Surface and Ground Waters,” Project 9-25 (Phase I), (with W.C. Huber, N. Eldin, J. Greene, and J. Lundy), Final Report to National Research Council, NCHRP, September 1995.
- “Annual Report for the Oregon Water Resources Research Institute,” Submitted to USGS, 1996.
- “Effect of Construction and Repair Materials on Surface and Ground Waters,” roject 9-25 (Phase II), (with W.C. Huber, N. Eldin, J. Greene, and J. Lundy), Interim Report to National Research Council, NCHRP, December 1996.
- “Annual Report for the Oregon Water Resources Research Institute,” Submitted to USGS, 1997.
- “Enhancing Biodegradation with Sorption and Alternating Aerobic/Anaerobic Environments,” Final Report to WRHSRC, 1997.

- “Inhibition, Inactivation and Recovery: A Universal Model for Aerobic Cometabolic Degradation of Aliphatic Compounds,” Final Report to WRHSRC, 1997.
- “Demonstration of Interceptor Trench for the Bioremediation of Pentachlorophenol-Contaminated Groundwater,” Final Report to WRHSRC, 1997.
- “Draft Final Report Summary,” (with N. Eldin, W. Huber, P.O. Nelson, and R. Leahy), Project HR 25-9 “Environmental Impact of Construction and Repair Materials on Surface and Ground Waters,” to National Research Council, NCHRP, December 1, 1997.
- “Testing Protocols for Solutions Eluted with Water from Highway Construction and Repair Materials, Draft,” (with N. Eldin, W. Huber, P.O. Nelson, and R. Leahy), Project HR 25-9, “Environmental Impact of Construction and Repair Materials on Surface and Ground Waters,” to National Research Council, NCHRP, December 1, 1997.
- “Annual Report for the Oregon Water Resources Research Institute,” Submitted to USGS, 1998.
- “Feasibility of a Drought Set-Aside Program for the Klamath Basin,” Submitted to the Klamath Water Users Association, 1998.
- “Intrinsic Transformation of AlkoxySilanes and Chlorinated Ethenes at Site-300,” Final Report to Lawrence Livermore National Laboratory Site 300-Project, May 1998.
- “Annual Report for the Oregon Water Resources Research Institute,” Submitted to USGS, 1999.
- “Five Year Review for the Oregon Water Resources Research Institute,” Submitted to USGS, 1999.

RESEARCH

Prior Research

- “Chemical, Physical, and Biological Impacts of Dredging in Tillamook Bay, Oregon,” (with C. Sollitt and L. Slotta), U.S. Army Corps of Engineers, \$68,698, 1973.
- “Dredging in Estuaries-Initiation Grant,” (with L. Slotta, C. Sollitt, and D. Hancock), National Science Foundation, \$59,009, 1973.
- “A Bioassay to Assess Toxicity to Aerobic Wastewater Treatment,” Water Resources Research Institute, OSU, \$8,600, 1974.
- “Environmental Impacts of Dredging in Estuaries,” National Science Foundation, \$102,398, 1974.
- “Environmental Impacts of Dredging in Estuaries,” National Science Foundation, \$57,783, 1975.
- “Energy Costs of Regional Wastewater Treatment,” U.S. EPA, \$50,000, 1976.
- “Environmental Impacts of Dredging in Estuaries,” National Science Foundation, \$148,000, 1976.
- “The Influence of Technology on Quality of Life,” National Science Foundation, \$10,500, 1977.
- “Field Evaluation of Rock Filters for Removal of Algae in Lagoon Effluents,” U.S. EPA, \$59,950, 1977-1978.
- “Uptake of Heavy Metals by Estuarine Infauna,” Oregon Water Resources Research Institute, \$12,500, 1977-1978.
- “Biological Degradation of Hydrazine, Monmethyl Hydrazine, and Unsymmetrical-Demethyl-Hydrazine,” U.S. Air Force, \$11,000, 1977-1980.
- Interagency Personnel Agreement, U.S. Environmental Protection Agency, \$120,000 per year 1982-1985.
- “A Bacterial Bioassay for Level I Toxicity Testing,” U.S. Environmental Protection Agency, \$24,000 1978.
- “Coos Bay Offshore Disposal Site Investigation, Phase I,” (with P. Nelson), U.S. Army Corps of Engineers, \$62,000, 1978-1979.
- “Effect of Dissolved Oxygen Concentration on ATP Viability of Activated Sludge,” (with P. Nelson), National Science Foundation, \$62,000, 1979-1981.

- “Evaluation of Wastewater Lagoon for Hatchery Wastewater,” U.S. Fish and Wildlife Service, \$14,000, 1979.
- “Gas Turbine Engine Smoke Abatement,” (with R. Boubel), U.S. Air Force, \$106,000, 1980.
- “Coos Bay Offshore Disposal Site Investigation, Phase II,” (with C. Sollitt, P.O. Nelson, and D. Hancock), \$274,000, 1981.
- Cooperative Agreement, U.S. Environmental Protection Agency, \$42,000, 1981.
- Cooperative Agreement, U.S. Environmental Protection Agency, \$48,000, 1982.
- “Use of Biomass for Energy Production in the Northwest,” \$120,000, U.S. Department of Agriculture, 1982-1984.
- Cooperative Agreement, U.S. Environmental Protection Agency, \$179,000, 1983.
- Summer Support Program, U.S. Air Force, \$11,000, 1983.
- Cooperative Agreement, U.S. Environmental Protection Agency, \$42,000, 1984.
- “Heavy Metal Redistribution and Mobilization from Geochemical Phases of Estuarine Sediments,” (with P. Nelson), Water Resources Research Institute, \$14,000, 1984.
- “Effect of Sorption on Bacterial Metabolism of Trace Toxicants in Groundwater Aquifers,” (with S.L. Woods), Water Resources Research Institute, \$28,997, 1985-1987.
- “Use of Aerated Biofilm Reactors for Biodegradation of Toxic Compounds,” (with S.L. Woods and S. Strand), U.S. Environmental Protection Agency, \$444,187, 1986-1989 (co-PI).
- “Bioaccumulation of Particulate- and Cosolvent-Bound Toxicants by Benthic Marine Organisms,” (with S.L. Woods and J. Baham), U.S. Environmental Protection Agency, \$249,987, 1986-1988.
- “Heterotrophic Oxidation, Nitrification, Denitrification, and Anaerobic Fermentation in a Substratum-Aerated Biofilm Reactor,” (with S. Strand), National Science Foundation, \$178,779, 1986-1989.
- “Enhancing Biodegradation with Sorption and Alternating Aerobic/Anaerobic Environments,” Western Region Hazardous Substance Research Center, \$150,253, 1989-1993.
- Training and Technology Transfer, Western Region Hazardous Substance Research Center: \$123,321, 1989; \$132,315, 1990; \$141,834, 1991; \$100,000, 1992; \$100,000, 1993; \$100,000, 1994; \$100,000, 1995; \$100,000, 1996; \$50,000, 1997; \$50,000, 1998.
- “National Conference on Technology Transfer,” U.S. Environmental Protection Agency, \$52,816, 1991.
- “National Conference on Environmental Engineering Education,” National Science Foundation, \$31206, 1991.
- “Degradation of Chlorinated Aliphatic Compounds by Nitrifying Bacteria,” Western Region Hazardous Substance Research Center, \$168,000, 1992-1994.
- “Remediation of Contaminated Soil at the Baldock Maintenance Facility,” (with S.L. Woods), Oregon Department of Transportation, \$40,200, 1993-1994; \$6,400, 1995.
- “Conference on the Importance of Field Research for Superfund Site Remediation,” EPA, Office of Research and Development, \$125,000, 1994-1995.
- Support for OWRRI from USGS, \$120,000, 1994; \$89,000, 1995; \$20,000, 1996; \$20,000, 1997; \$20,000, 1998; \$67,000, 1999.
- “Salmon Habitat Study: Gravel Removal, Salmon Habitat and Stream Health,” Oregon Division of State Lands, \$110,000, 1994-1995.
- “Environmental Impact of Highway Construction and Repair Materials on Surface and Ground Waters,” (with N. Eldin, W. Huber, P. Nelson, J. Lundy, and R. Leahy), National Cooperative Highway Research Program, \$260,000, 1994; \$280,000, 1995; \$300,000, 1996-1997; \$500,000, 1998.
- “Inhibition, Inactivation, and Recovery: A Universal Model for Aerobic Cometary Degradation,” Western Region Hazardous Substance Research Center, \$66,000, 1995; \$124,921, 1996.

- “Degradation of TCE and PAHs by Cometabolic Organisms,” (with M. Hyman), POSCO, Pohang, Korea, \$50,000, 1995-1996.
- “Demonstration of Interceptor Trench for the Bioremediation of Pentachlorophenol-Contaminated Groundwater,” Western Region Hazardous Substance Research Center, \$129,524, 1995; \$91,724, 1996.
- “The Effect of Apparent Eh, Compound Structure and Electron Donor on Anaerobic Biotransformation of Trinitrotoluene and its Metabolites,” Western Region Hazardous Substance Research Center, \$46,454, 1995.
- “Columbia River Comprehensive Technical Assessment,” Department of Energy, \$55,000.
- “An Assessment of Economic Tradeoffs between Environmental Quality and Agricultural Production: The Case of the Klamath Basin,” (with P.C. Klingeman), USDA CSREES, \$42,000, 1995-1996.
- “Conference on Technology Transfer for Hazardous Waste Site Remediation,” US EPA, \$25,000, 1996.
- “Characterization of Microbial Activity at Site 300 of Lawrence Livermore Laboratory,” (with L. Semprini), Lawrence Livermore Laboratory (DOE), \$106,497, 1996-1997.
- “Demonstration of a Permeable Barrier Technology for the Bioremediation of Ground Water Contamination with Waste Mixture (with S.L. Woods), Western Region Hazardous Substance Research Center, \$121,577.
- “Removal of Total Dissolved Solids by Reverse Osmosis,” Wah Chang Corporation and Oregon Metals Initiative, \$67,000.
- “Aerobic Cometabolism of Methyl tert-butyl Ether by Microorganisms Grown on Aliphatic Hydrocarbons,” Western Region Hazardous Substance Research Center, \$49,000; 1999; \$49,000, 2000.

Current Research

- “Technical Assistance for Communities Affected by Superfund Sites,” U.S. EPA, \$150,000, 1994; \$125,000, 1995; \$275,000, 1996; \$250,000, 1997; \$485,558, 1998; \$250,000, 1999; \$600,000, 2000-2001.
- “Technical Assistance to Brownfields, Western Region Hazardous Substance Research Center, \$135,000, 1998-1999; \$115,000, 1999-2000; \$150,000, 2000-2001.
- Support for Center for Water and Environmental Sustainability, USGS, \$89,000, 2001-2002.