DAVID A. VERBRUGGE, BS (ACS)
State of Alaska Public Health Laboratory
Alaska Department of Health and Social Services

April of 2019

EDUCATION

1997 Post-graduate course work (2 Years), All coursework completed for M.S. (ABD) Environmental Analytical Chemistry, Michigan State University East Lansing MI

1988 BS, Chemistry (ACS Certified), Michigan State University, East Lansing Ml

CONTINUING EDUCATION -

Throughout my career I have strived to remain current within the fields of Analytical Sciences and Applied Toxicology. My Post-graduate studies included Analytical Chemistry, Environmental Chemistry, Applied Statistics and Toxicology. Scientific Journals and Textbooks are a routine source of current reading materials. My interests have covered a broad spectrum of applied analytical toxicology, with my most recent work relating to the clinical and postmortem analysis of Novel Psychotropic Substances.

I have participated in national meetings of multiple professional organization including:

American Chemical Society
American Society of Mass Spectrometry
Centers for Disease Control and Prevention
Society of Environmental Toxicology
Society of Forensic Toxicology

PROFESSIONAL EXPERIENCE

12/02-present Chemist V, State of Alaska Public Health Laboratory

Chief Chemist and Manager of the Analytical Toxicology program at the State of Alaska Public Health laboratory (AKPHL). The AKPHL serves the entire state. Though our population is modest, our geographic area is nearly 2/3 the size if the continental US. Given our remote location and limited access to technical resources, my position requires a broad knowledgebase in Analytical Toxicology and Chemistry. I have provided technical instruction, method development and runtime process validation as our lab has developed capacity to measure drugs, poisons, environmental contaminants, and chemical terrorism agents in clinical samples and unknown materials. As the lead expert in mass spectrometry and

separation science for our department, I continue to maintain my bench skills with GC-MS, LC-MS/MS and ICP-MS instruments. The AKPHL is required to meet Federal CLIA regulation. I have successfully implemented our QA/QC program for analytical toxicology testing to meet these requirements. I have participated in several biannual federal CLIA audits at our laboratory without significant findings. For the past 12+ years, I have sat on the US Centers for Disease Control's Chemical Threat Laboratory Response Network proficiency testing workgroup. In addition to test method development and data quality oversight, I participate alongside my medical community partners to maintain interpretive ranges for toxicology testing results. I have provided Expert Witness Testimony in both State and Federal courts as an Analytical Toxicologist. My administrative management responsibilities include budgeting, staffing, identifying potential future federal/ state funding resources and planning the general direction of our analytical testing program.

2/00-12/02 Environmental Specialist IV, Environmental Manager I (Acting, 7/17/01-8/1/02), Contaminated Sites Program, Section of Technical Services, Department of Environmental Conservation, State of Alaska

Environmental Specialist IV: Provide analytical chemistry and Quality Assurance support to staff, maintain the State's analytical methods for Petroleum Hydrocarbons, oversee development of and revision of Technical Guidance documents, supervise development of Contaminated Sites Program databases, and coordinate regulations updates. Supervise technical and clerical staff. Recruit technical staff positions under direct supervision. Provide technical training for program staff. Interact with the public via information meetings, formal presentations and public advisory workgroups. Grant manager for EPA Superfund development grant and EPA Voluntary Cleanup grant. Oversee implementation of the Voluntary Cleanup Program and the State-Owned/State-Lead Site Cleanup Program.

Environmental Conservation Manager I (acting): In addition to the above duties: Supervise additional technical staff, participate in recruitment activities for three positions, participate in reorganization of the Contaminated Sites Program, and perform budget analysis, maintenance, planning and tracking. Fully develop and integrate CERCLA (Superfund) process into state regulatory requirements. Oversee underground storage tank pollution prevention program, and oversee continued development of risk-based cleanup criteria, risk assessment practices, data management, and community involvement functions.

5/97-2/00 Quality Specialist, Chugach North Technical Services assigned to Alyeska Pipeline Service Company, Anchorage, AK

Reviewed, verified and validated contractor laboratory data quality performance against audit closure requirements, regulatory requirements, industry benchmarks and Alyeska data quality objectives. Reviewed contractor's Quality Program, Operating Procedures and Policy changes against Alyeska contractual, Alyeska quality (QA-36), Industry Standard (ASTM, TQM,) and Regulatory Agency

(EPA, State of AK) compliance requirements. Developed and reported contractor data quality performance metrics using statistical tools for Quality Control: Control Charts, Trending, Confidence Limits, Error Propagation, Duplicate Samples, Matrix Spikes, etc. Developed and maintained Microsoft Access Databases to track audit findings and inventories, and developed and maintained Microsoft Excel spreadsheets, using advance database functions and Pivot Tables, to track a variety of contractor functions.

12/88-5/97 Analytical Laboratory Manager, Aquatic Toxicology Laboratory, Michigan State University, East Lansing, MI

Managed environmental analytical chemistry laboratory. Hired and supervised technicians, prioritized and coordinated contracted and graduate student chemistry projects, and provided technical expertise. Participated in the development of project grant proposals. Participated in the design of a new analytical laboratory building, purchased equipment and supervised the start-up of organic analyses at the new facility. Analyzed PCBs, toxaphene, DDTs and chlordanes in a variety of sample matrices including water, sediment, plankton, insects, fish, bird tissues (blood, egg, whole body, and selected organs) and mammalian tissues (muscle, liver, and blood). Developed and implemented Standard Operating Procedures (SOPs), Quality Assurance Project Plans (QAPPs) and field sampling plans. Analyzed data and prepared manuscripts and project reports. Presented project results at national and international scientific conferences, and published results in the peer reviewed literature.

PUBLICATIONS

Verbrugge, D.A., J.P. Giesy, M.A. Mora, L.L. Williams, R.M. Crawford, R. Rossman, R.A. Moll and M.L. Tuchman. 1995. Concentrations of Dissolved and Particulate PCBs in Water from the Saginaw River, Michigan. *J. Great Lakes Res.* 21:219-233.

Verbrugge, D.A., J.P. Giesy, M. Mora, L.L. Williams, R. Crawford, R. Moll, R. Rossman and M. Tuchman. 1993. Concentrations of Dissolved and Particulate PCBs in the Saginaw River: As Determined by Filtration and XAD-2 Resin Extraction. In H. Fiedler, H. Frank, O. Hutzinger, W. Parzfall, A. Riss and S. Safe (Eds), Vol. 14, pp. 125-128. *Organohalogen Compounds; Emission Control, Transport and Fate and Environmental Levels and Ecotoxicology*. Federal Environmental Agency, Austria.

Verbrugge, D. A., R. A. Othoudt, K. R. Grzyb, R. A. Hoke, J. B. Drake, J. P. Giesy and D. Anderson. 1991. Concentrations of inorganic and organic contaminants in sediments of six harbors on the North American Great Lakes. *Chemosphere*. 22:809-820.

Coleman, R.M., G Ojeda-Torres, W Bragg, D Fearey, P McKinney, L Castrodale, **D Verbrugge**, K Stryker, E DeHart, M Cooper, E Hamelin, J Thomas, R C Johnson**.** 2018. Saxitoxin Exposure Confirmed by Human Urine and Food Analysis. *Journal of Analytical Toxicology,*42 (7), e61-e64, DOI: 10.1093/jat/bky031

Gerlach, S Craig, LK Duffy, MS Murray, PM Bowers, R Adams, **DA Verbrugge.** 2006. An exploratory study of total mercury levels in archaeological caribou hair from northwest Alaska. *Chemosphere* 65 (11), 1909-1914

Verbrugge, L.A., Giesy, J.P., **Verbrugge, D.A.,** Woodin, B.R. and Stegeman, J.J. 2001. Catalytic and immunochemical properties of hepatic cytochrome P450-1A in three avian species treated with β-naphthoflavone or isosafrole. Comp. Biochem. Physiol. C 130(1):67-83.

Snyder, Shane A., Timothy L. Keith, **David A. Verbrugge,** Erin M. Snyder, Timothy S. Gross, Kurunthachalam Kannan, and John P. Giesy 1999. Analytical Methods for Detection of Selected Estrogenic Compounds in Aqueous Mixtures. *Environ. Sci. Technol.,* **33** (16), 2814 -2820, 1999

Froese, K.L., **D.A. Verbrugge,** G.T. Ankley, G.J. Niemi, C.P. Larsen, and J.P. Giesy. 1998. Bioaccumulation of Polychlorinated Biphenyls from Sediments to Aquatic Insects and Tree Swallow Eggs and Nestlings in Saginaw Bay, Michigan, USA. *Environ. Toxicol. and Chem.* 17(3):484-492.

Auman, H.J., J.P. Ludwig, C.L. Summer, **D.A. Verbrugge,** K.L. Froese, T. Colborn and J.P. Giesy. PCBs, DDE, DDT, and TCDD-EQ in Two Species of Albatross on Sand Island, Midway Atoll, North Pacific Ocean. 1997. *Environ. Toxicol. Chem.* 16(3):498-504.

Froese, K.L., **D.A. Verbrugge,** S.A. Snyder, F. Tilton, M. Tuchman, A. Ostaszewski, J.P. Giesy. PCBs in the Detroit River Water Column. 1997. *J. Great Lakes Res.* 23(4):440-449.

Giesy, J.P., D. Jude, D.E. Tillitt, R.W. Gale, J.C. Meadows, J.L. Zajieck, P.H. Peterman, **D.A. Verbrugge,** Sanderson, J.T., Schwartz, T.R. and M.L. Tuchman. 1997. Polychlorinated dibenzo-*p*-dioxins, dibenzofurans, biphenyls and 2,3,7,8-tetrachlorodibenzo-*p*-dioxin equivalents in Fishes from Saginaw Bay, Michigan. *Environ. Toxicol. Chem.* 16(4):713-724.

Besser, J.P. , J.P. Giesy, J.A. Kubitz, **D.A. Verbrugge,** T.G. Coon and W.E. Braselton. 1996. Assessment of Sediment Quality in Dredged and Undredged Areas of the Trenton Channel of the Detroit River, Michigan USA, using the Sediment Quality Triad. *J. Great Lakes Res.* 22(3):683-696.

Summer, C.L., J.P. Giesy, S.J. Bursian, J.A. Render, T.J. Kubiak, P.D. Jones, **D.A. Verbrugge** and R.J. Aulerich. 1996. Effects Induced by Feeding Organochlorine-Contaminated Carp from Saginaw Bay, Lake Huron, to Laying White Leghorn Hens. I. Effects on Health of Adult Hens, Egg Production, and Fertility. *J. Toxicol. Environ. Health* 49:389-407.

Summer, C.L., J.P. Giesy, S.J. Bursian, J.A. Render, T.J. Kubiak, P.D. Jones, **D.A. Verbrugge** and R.J. Aulerich. 1996. Effects Induced by Feeding Organochlorine-Contaminated Carp from Saginaw Bay, Lake Huron, to Laying White Leghorn Hens. II. Embryotoxic and Teratogenic Effects. *J. Toxicol. Environ. Health* 49:409-438.

Giesy, J.P., W.W. Bowerman, M.A. Mora, **D.A. Verbrugge,** R.A. Othoudt, J.L. Newsted, C.L. Summer, R.J. Aulerich, S.J. Bursian, J.P. Ludwig, G.A. Dawson, T.J. Kubiak, D.A. Best and D.E. Tillitt. 1995. Contaminants in Fishes from Great Lakes-Influenced Sections and Above Dams of Three Michigan Rivers: Implications for Health of Bald Eagles. *Arch. Environ. Contamn. Toxicol.* 29:309-321.

Heaton, S.N., S.J. Bursian, J.P. Giesy, D.E. Tillitt, J.A. Render, P.D. Jones, **D.A. Verbrugge,** T.J. Kubiak and R.J. Aulerich. 1995. Dietary exposure of mink to carp from Saginaw Bay. I. Effects on Reproduction and Survival and potential risks to wild mink populations. *Arch. Environ. Contamn. Toxicol.* 28:334-343.

Heaton, S.N., S.J. Bursian, J.P. Giesy, D.E. Tillitt, J.A. Render, P.D. Jones, **D.A. Verbrugge,** T.J. Kubiak and R.J. Aulerich. 1995. Dietary Exposure of Mink to Carp from Saginaw Bay, Michigan: II. Hematology and Liver Pathology. *Arch. Environ. Contamn. Toxicol.* 29:411-417.

Larson, J.M., W.H. Karasov, L. Sileo, K.L. Stromberg, B.A. Hanbidge, J.P. Giesy, P.D. Jones, D.E. Tillitt and **D.A. Verbrugge**. 1995. Reproductive Success, Developmental Abnormalities, and Environmental Contaminants in Double-Crested Cormorants (*Phalacrocorax auritus*). *Arch. Environ. Contamn. Toxicol.* 15:553-559.

Williams, L.L and J.P. Giesy, **D.A. Verbrugge,** S. Jurzysta, and K. Stromberg. 1995. Polychlorinated Biphenyls and 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Equivalents in Eggs of Double-Crested Cormorants from a Colony Near Green Bay, Wisconsin, USA. *Arch Environ. Contam. Toxicol.* 29:327-333.

Giesy, J.P., R. Crawford, P.D. Jones, D.E. Tillitt, G.T. Ankley, J.L. Newsted, L.L. Williams, G. Walter and **D.A. Verbrugge**. 1994. Uptake, disposition and effects of dietary 2,3,7,8-tetrachlorodibenzo-p-dioxin on the survival, growth, reproduction, histology, biochemistry and haematology of rainbow trout. pp 64-68 In L. Norrgren (Ed.) *Report from the Uppsala Workshop on Reproduction Disturbances in Fish*, October 20-22, 1993, Uppsala Sweden.

Giesy, J.P., **D.A. Verbrugge,** R. Othoudt, W.W. Bowerman, M.A. Mora, P.D. Jones, J.L. Newsted, A.J. Bath, C. Vandervoort, S.N. Heaton, R.J. Aulerich, S.J. Bursian, J.P. Ludwig, M. Ludwig, G.A. Dawson, T.J. Kubiak, D.A. Best, and D.E. Tillitt. 1994. Contaminants in Fishes from Great Lakes-Influenced Sections and Above Dams on Three Michigan Rivers: I Concentrations of Organo-chlorine Insecticides, PCBs, Dioxin Equivalents and Mercury. *Arch. Environ. Toxicol. Chem.* 27:202-212.

Giesy, J.P., **D.A. Verbrugge,** R. Othoudt, W.W. Bowerman, M.A. Mora, P.D. Jones, J.L. Newsted, C. Vandervoort, S.N. Heaton, R.J. Aulerich, S.J. Bursian, J.P. Ludwig, M. Ludwig, G.A. Dawson, T.J. Kubiak, D.A. Best, and D.E. Tillitt. 1994. Contaminants in Fishes from Great Lakes-Influenced Sections and Above Dams on Three Michigan Rivers: II Implications for the Health of Mink. *Arch. Environ. Toxicol. Chem.* 27:213-223.

Giesy, J.P., R. Crawford, P.D. Jones, D.E. Tillitt, G.T. Ankley, J.L. Newsted, L.L. Williams, G. Walther and **D.A. Verbrugge** 1993. Uptake, Disposition and Effects of Dietary 2,3,7,8-tetrachlorodibenzo-p-dioxin on the Survival, Growth, Reproduction, Histology, Biochemistry and Haematology of Rainbow Trout. In H. Fiedler, H. Frank, O. Hutzinger, W. Parzfall, A. Riss and S. Safe (Eds), Vol. 12, pp. 235-238. *Organohalogen Compounds; Emission Control, Transport and Fate and Environmental Levels and Ecotoxicology*. Federal Environmental Agency, Austria.

Jones, P. D., J. P. Giesy, T. J. Kubiak, **D. A. Verbrugge,** J. C. Newsted, J. P. Ludwig, D. E. Tillitt, R. Crawford, N. DeGalan and G. T. Ankley. 1993. Biomagnification of bioassay-derived 2,3,7,8-Tetrachlorodibenzo-p-dioxin equivalents. *Chemosphere*. 26:1203-1212.

Jones, P. D., J. P. Giesy, J. L. Newsted, **D. A. Verbrugge,** D. L. Beaver, G. T. Ankley, D. E. Tillitt, and K. B. Lodge. 1993. Determination of 2,3,7,8-Tetrachloro-dibenzo-p-dioxin equivalents in tissues of birds at Green Bay, Wisconsin, USA. *Arch. Environ. Contamn. Toxicol.* 24:345-354.

Jones, P. D, J. P. Giesy, J. L. Newsted, **D. A. Verbrugge,** J. P. Ludwig, M. J. Ludwig, H. Auman, T. J. Kubiak, and D. Best. 1992. Accumulation of 2,3,7,8-Tetrachlorodibenzo-p-dioxin equivalents by double crested cormorant (*Phalacrocorax auritus*, Pelicaniformes) chicks in the North American Great Lakes. *Ecotox. Environ. Safety*. 27:192-209

Mora, M., H. J. Auman, J. P. Ludwig, J. P. Giesy, **D. A. Verbrugge** and M. E. Ludwig. 1992. PCBs and chlorinated insecticides in plasma of Caspian terns: relationships with age, productivity and colony-site tenacity. *Arch. Environ. Toxicol. Chem.* 24:320-331.

Williams, L. L., J. P. Giesy, N. DeGalan, **D. A. Verbrugge,** D. E. Tillitt, G. T. Ankley and R. A. Welch. 1992. Prediction of concentrations of 2,3,7,8-TCDD equivalents (TCDD-EQ)from total concentrations of PCBs in fish fillets. *Environ. Sci*. *Technol*. (26:1151-1159).

Ankley, G. T., D. E. Tillitt, J. P. Giesy, P. D. Jones and **D. A. Verbrugge**. 1991. Bioassay-derived 2,3,7,8-Tetrachlorodibenzo-p-dioxin toxic equivalents (TCDD-EQ) in the flesh and eggs of Lake Michigan chinook salmon and possible implications for reproduction. *Can. J. Fish. Aquat. Sci*. 48:1685-1690.

Othoudt, R. A., J. P. Giesy, K. R. Grzyb, **D. A. Verbrugge,** R. A. Hoke and D. Anderson. 1991. Evaluation of the effects of storage time on the toxicity of sediments. *Chemosphere*. 22:801-807.

Tillitt, D. E., G. T. Ankley, **D. Verbrugge** and J. P. Giesy. 1991. H-4-II-E Rat Hepatoma cell bioassay-derived 2,3,7,8-Tetrachlorodibenzo-p-dioxin equivalents in colonial fish-eating waterbird eggs from the Great Lakes. *Arch. Environ. Contamn. Toxicol*. 21:91-101.

COLLEGE COURSEWORK SUPPLEMENT

DAVID A. VERBRUGGE

Course #	Course Title	Semester Credits
Category 1: Advanced Studies (post-graduate work)		
PHM 814	Advanced Principles of Toxicology	3.00
BCH 461	Biochemistry I	3.00
BCH 462	Biochemistry II	3.00
CEM 844	Structure Elucidation - Instrumental Methods	2.00
CEM 832	Mass Spectrometry	3.00
FW 814	Environmental Chemodynamics & Risk Assessment	4.00
CSS 855	Interfacial Environmental Chemistry	4.00
RD 836	Legal Aspects of Environmental Regulation	3.00
FW 891	Adv. Topics: Non-Parametric Statistics	2.00
STT 464	Statistical Methods for Biologists I: ANOVA	3.00
STT 465	Statistical Methods for Biologists II: Sampling Design	3.00
Category 2: Core Chemistry		
CEM 151	Principles of Chemistry I	2.66
CEM 182	Honors Chemistry II - Principles	2.66
CEM 161	Introductory Chemistry Lab	0.66
CEM 153	Introduction Inorganic Chemistry	2.00
CEM 163	Introduction inorganic Laboratory	1.33
CEM 351	Organic Chemistry	2.00
CEM 352	Organic Chemistry	2.00
CEM 353	Organic Chemistry	2.00
CEM 354	Organic Chemistry Laboratory	1.33
CEM 355	Organic Chemistry Laboratory	1.33
CEM 356	Organic Chemistry Laboratory	1.33
CEM 162	Quantitative Analysis	2.00
CEM 361	Chemical Thermodynamics	2.00
CEM 362	Analytical -Physical Chemistry I	2.00
CEM 363	Analytical -Physical Chemistry II	2.00
CEM 372	Analytical -Physical Chemistry Lab I	1.33
CEM 373	Analytical -Physical Chemistry Lab II	1.33
CEM 471	Analytical -Physical Chemistry Lab III	1.33
CEM 472	Analytical -Physical Chemistry Lab IV	1.33
CEM 834	Advanced Analytical Chemistry	2.00
CEM 411	Inorganic Chemistry I	2.00
CEM 412	Inorganic Chemistry II	2.00
CEM 461	Theoretical Chemistry I	2.00
CEM 462	Theoretical Chemistry II	2.00
CEM 419	Independent Study - Research	2.66

CEM 419	Independent Study - Research	2.00

Course #	**Course Title**	**Semester Credits**
Category 3: Mathematics and Computer Science		
MTH 112	Calculus & Analytic Geometry I	3.33
MTH 113	Calculus & Analytic Geometry II	3.33
MTH 214	Calculus & Analytic Geometry Ill	2.66
MTH 215	Calculus & Analytic Geometry IV	2.66
MTH 310	Differential Equations	2.00
CPS 120	Computer Programming for Engineering & Science: Fortran	2.00
CPS 251	Algorithms & Computing I: Pascal	2.00
CPS 252	Algorithms & Computing II: Pascal	2.00
Category 4: Misc. Science		
PHY 287	Principles of Physics	2.66
PHY 288	Principles of Physics	2.66
PHY 289	Principles of Physics	2.66
PHY 391	Introduction to Quantum Physics	2.66