

J. Andrew Tachovsky, P.E., M.S.

SENIOR ENGINEER

CONTACT INFORMATION

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PROFESSIONAL PROFILE

Mr. Andrew Tachovsky is a licensed Senior Engineer at ToxStrategies with over 10 years of experience in human health risk assessment and engineering research. His area of expertise is in numerical analysis of environmental data associated with shale gas development and heavy industrial activity, air quality modeling and analysis, multi-media exposure and risk assessment modeling, dose reconstruction analysis, geospatial and statistical analysis. Mr. Tachovsky is skilled at incorporating monitoring data and environmental sampling into numerical models to reduce conservatism and bring accuracy to the modeling process. He is skilled at dose reconstruction modeling of large industrial hygiene datasets to estimate occupational exposures. He is skilled at utilizing GIS to bring context to risk assessment results by mapping the specific impact for each resident in a community. Mr. Tachovsky has managed large, multi-discipline science and engineering projects; from experimental design, to field sampling and laboratory analysis, to computer modeling and numerical analysis, to assessment of impact on human health, and finally to resolution. He has served as a liaison to help large industrial facilities understand the language of risk assessment and develop actionable operating conditions that satisfied regulatory risk assessment requirements.

EDUCATION AND DEGREES EARNED

M.S. Civil Engineering, University of Texas at Austin, 1997
B.S. Civil Engineering, University of Virginia, 1995

CERTIFICATIONS

Licensed Professional Engineer, Texas Board of Professional Engineers #87913

PROFESSIONAL ASSOCIATIONS

Society for Risk Analysis

Air and Waste Management Association

SELECTED PROJECT EXPERIENCE

Air Quality Analysis and Modeling

Conducted a comprehensive analysis of impacts to an urban area in North Texas from shale gas drilling and production. Compiled over 20 years of air monitoring data and compared the data to state and federal health benchmarks to support an assessment of air quality. Evaluated several fingerprinting techniques to identify chemicals specifically associated with shale gas emissions. Conducted multiple linear regression analysis to identify upward and downward trends associated with air toxics in the region. Evaluated several state and federal emissions inventories to identify contributors to concentrations of air toxics in the region. Investigated meteorological trends impacting the migration of air pollutants from shale gas production and compression facilities.

Developed a GIS-based model of air quality based on over 15 years of historical air monitoring data at 18 monitoring locations in an urban area in South Texas. This model was used to calculate long and short term exposure concentrations of benzene, to evaluate long term trends in benzene concentrations, to evaluate the impact of an operational upset at an industrial facility on a nearby neighborhood, and to conduct an assessment of short term odor concerns.

Implemented a geostatistical analysis which incorporated AERMOD deposition modeling and historic soil sample results for dioxins and furans in a Midwestern urban area. The model used a multiple linear regression model to develop a relationship between deposition rate and soil concentration, modeled spatial relationships using a semivariogram, and used sequential Gaussian simulation (SGS) to develop 100 realizations of soil concentration over a grid containing 68,000 points. The model was able to estimate a distribution of soil concentration at each point in the grid.

Developed a GIS-based model of air quality based on over 20 years of historical air monitoring data for an urban area in East Texas. This model was used to benchmark EPA's National Air Toxics Assessment modeling, to quantify the conservatism associated with EPA's HAPEM and ASPEN models, to quantify contributions from different sources of HAPs in the area (e.g., point sources, mobile sources.), to evaluate long term trends in air concentrations of HAPs, and to assess population cancer risk to residents in area.

Developed and implemented a program to extract, load, and query USEPA's RSEI dataset and obtain constituent specific air concentrations for each facility in USEPA's TRI emissions inventory on a 1km grid covering the US. Modeled air concentrations were compared to monitoring data to benchmark the RSEI model.

Conducted gaussian air dispersion modeling of emissions from an industrial lagoon to estimate the exposure concentration of sulfur compounds at nearby receptors. Results from the air dispersion model were incorporated into a GIS-based model and combined with stationary air monitoring data to benchmark the predicted exposure concentration.

Developed a model to estimate exposure to fugitive dust containing hexavalent chromium that originated from construction and demolition activities at an industrial site. The analysis was focused on incorporating air monitoring data into the conservative approach outlined in AP-42 guidance documents and proposed by the New Jersey Department of Environmental Protection.

Exposure and Risk Analysis

Conducted a fingerprinting analysis of polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofuran (PCDFs) and polychlorinated biphenyls (PCBs) concentrations in blood serum using principal components analysis. This analysis examined blood serum data collected from workers at a former secondary copper smelter and compared their congener profile to the congener profile observed in the NHANES dataset.

Conducted a fingerprinting analysis of PCDDs, PCDFs and polybrominated diphenyl ethers (PBDEs) in fish tissue using principal components analysis. This analysis examined fish tissue data collected from rivers in a Southern state and compared their chemical profile to several source profiles observed in the published literature.

Built a model to reconstruct benzene dose associated with occupational exposure in a large chemical manufacturing facility. The model incorporated over 30 years of industrial hygiene measurements, and was used to estimate benzene dose associated with a wide variety of job functions and exposure areas.

Constructed a probabilistic risk assessment to estimate risk associated with exposure to benzene found in a consumer soft drink. The risk assessment allowed for variation in body weight with age, multiple formulations of soft drink, and probabilistic treatment of all exposure variables.

Constructed a probabilistic exposure assessment to address nonylphenol ethoxylates (NPEs) found in a consumer candy product. The risk assessment used statistical methods to develop distributions for different product formulations from different countries using both composite and discrete sampling regimes. Exposure variables were also treated in a probabilistic framework.

Developed a comprehensive multi-pathway risk assessment model (TexRisk) that was used by the State of Texas to evaluate emissions from hazardous waste combustion facilities. This GIS-based model incorporated air dispersion modeling from ISCST3 gaussian dispersion model, emission rates calculated from stack analytical data, and receptor information gathered during site assessment. The model included a refined approach for analyzing mercury fate and transport in watersheds and subsequent uptake into fish. This model was successfully used to permit over 12 industrial sites, including four commercial industrial waste combustors.

Developed methodology and guidance for incorporation of probabilistic exposure modeling into the site remediation process at the Texas Commission on Environmental Quality. Guidelines were developed for 1 and 2 dimensional monte-carlo analysis, fitting distributions to site specific data, incorporation of standard exposure distributions from federal regulatory guidance.

Environmental Engineering

Managed a large infrastructure project to deliver a storage facility used to store flammable and hazardous materials and environmental samples. The facility included frozen and refrigerated storage of environmental samples (soil, water, tissue) and light sweet crude oil samples. The project involved the development and implementation of an inventory system to track the movement of samples and the homogenization and subdivision of samples.

Led an investigation to determine the source of arsenic in groundwater in the Southern High Plains of Texas. This investigation included 4 drilling expeditions to acquire soil cores, sampling and testing the cores for anions and metals, and developing a statistical model to describe the contribution to arsenic concentrations in groundwater from geologic and anthropogenic sources.

Served as lead engineer for all engineering design review elements for construction of the first low-level radioactive waste disposal facility in Texas including: analysis of infiltration through the landfill cover system, analysis of surface water conveyance systems, analysis of structural stability of waste disposal trench through assessment of settlement, slope stability, subsidence, and erosion.

Developed a GIS based modeling framework for the assessment of groundwater and surface water relationships incorporating groundwater sampling data from the Texas Water Development Board, stream gauge data from the US Geological Survey, and soil core analysis of anions and cations. This framework was used to model the groundwater contribution to streams and rivers, and to evaluate the water quality implications of river water infiltration into groundwater based public drinking water systems in Texas

Developed a probabilistic financial model to project revenue, expenses, earnings and break-even for 6-year period, including sensitivity analysis on financial assumptions; valuation of present and future business using discounted case flow, venture capital, and multiplier methods.

Developed a model to predict diesel fuel degradation in anaerobic soil systems using bioenergetic theory. The model was then benchmarked and refined by collecting samples from a site undergoing remedial investigation in Texas, conducting laboratory experiments, and incorporating the experimental data into the model.

MANUSCRIPTS

Tachovsky, J.A., J.D. Urban, D.S. Wikoff, L.C. Haws and M.A. Harris. Reduction of a large fish tissue analyte database: identifying and assessing data specific to a remediation site for risk assessment application. *Chemosphere*. 80(5): 481-8.

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Haws, L. C., **J. A. Tachovsky**, E. S. Williams, L. F. Scott, D. Paustenbach, and M. Harris. 2008. Assessment of Potential Human Health Risks Posed by Benzene in Beverages. *J. Food Sci*. 73(4), T33-41.

Scanlon, B. R., R. C. Reedy, and **J. A. Tachovsky**. 2007. Semiarid unsaturated zone chloride profiles: Archives of past land use change impacts on water resources in the southern High Plains, United States, in *Water Resources Research*, vol. 43: W06423.

Reedy, R. C., B. R. Scanlon, J. P. Nicot, and **J. A. Tachovsky**. 2007. Unsaturated Zone Arsenic Distribution and Implications for Groundwater Contamination. *Environ Sci Technol.*, vol 41(20): 6914-6919.

ABSTRACTS AND PRESENTATIONS

Diliberto, J.J., Sirinek, L., Burkhalter, B., Wikoff, D.S., Hixon, G., Becker, J., Patterson, D.G., Turner, W., **Tachovsky, J.A.**, Birnbaum, L.S., Haws, L.C. Endometriosis in a cohort of women living in the Kanawha River Valley in West Virginia: Blood levels of non-dioxin-like PCBs and relationship with BMI and age. Presented at Dioxin 2011, August 21-25, 2011. Brussels, Belgium.

Haws, L.C., DeVito, M.J., Walker, N.J., Harris, M.A., **Tachovsky, J.A.**, Birnbaum, L.S., Farland, W.H., Wikoff, D.S. Development of a consensus-based weighting framework for evaluating estimates of relative potency for dioxin-like compounds that includes consideration of data from human cells. Presented at Dioxin 2011, August 21-25, 2011. Brussels, Belgium.

Thompson, C., C. Perry, D. Gaylor, **A. Tachovsky**, B. Burkhalter, and L. Haws. Derivation of an oral reference dose and drinking water screening level for sulfolane using benchmark dose modeling. Presented at the Society of Toxicology's 50th Annual Meeting, March 6-10, 2011. Washington, D.C.

Harris, M., **J.A. Tachovsky**, D. Staskal-Wikoff, L. Aylward, B. Burkhalter, T. Simon, L. Haws. Serum concentrations of dioxin-like compounds in a population in midland michigan: an evaluation of the impact of soil exposures. Presented at Dioxin 2010, September 12-17, 2010, San Antonio, TX.

Harris, M., **J.A. Tachovsky**, D. Staskal-Wikoff, T. Simon, B. Burkhalter, J. Urban, and L. Haws. Assessment of the Impact of Various Soil Cleanup Levels on Serum Concentrations of Dioxin-Like Compounds in Humans. Presented at the 49th Annual Meeting of Society of Toxicology. March 7-11, 2010. Salt Lake City, Utah.

Haws, L., **J.A. Tachovsky**, D. Staskal-Wikoff, L. Aylward, B. Burkhalter, J. Urban, T. Simon, M. Harris. An evaluation of the influence of different soil cleanup levels on the concentration of dioxin-like compounds in human serum. Presented at Dioxin 2010, September 12-17, 2010, San Antonio, TX.

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Tachovsky, A., D. Staskal, J. Urban, M.A. Harris, and L. Haws. Assessment of Environmental Data Collected in a Community With Numerous Petroleum Refining and Petrochemical Facilities. Presented at the 49th Annual Meeting of Society of Toxicology. March 7-11, 2010. Salt Lake City, Utah.

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Haws, LC, DeVito, MJ, Walker, NJ, Birnbaum, LS, Farland, WH, Harris, MA, **Tachovsky, JA**, Unice, KM, Scott, PK, Staskal-Wikoff, DF. Development of distributions of relative potency estimates to quantitatively assess uncertainty inherent in the TEFs for dioxin-like compounds: a proposed consensus-based weighting. Presented at Dioxin 2009. Beijing, China.

Staskal-Wikoff, DF, Harris, MA, Haws, LC, Birnbaum, LS, **Tachovsky, JA**. Probabilistic evaluation of cancer and non-cancer risk associated with exposure to BDE 209 in automobiles. Presented at Dioxin 2009. Beijing, China.

Urban, J.D., **J.A. Tachovsky**, D.F. Staskal, L.C. Haws, and M.A. Harris. Human Health Risk Assessment of Consumption of Fish from the Lower Passaic River. Presented at the 48th Annual Meeting of Society for Toxicology. March 15-19, 2009. Baltimore, MD.

Urban, J.D., L.C. Haws, L.F. Scott, P.S. Scott, D.F. Staskal, **J.A. Tachovsky**, K.M. Unice, and M.A. Harris. A Framework for Evaluating Serum Dioxin Data Derived from Biomonitoring Studies. Presented at the Society of Toxicology's 48th Annual Meeting, March 15-19, 2009. Baltimore, MD.

Tachovsky, J.A., M.A. Harris, D.F. Staskal, L.F. Scott, W.J. Luksemburg, D.P. Paustenbach, L.C. Haws. Analysis of Fish Tissue Concentrations of Dioxins and Furans Using Principal Components Analysis. Submitted Dioxin 2008. August 17–22. Birmingham, UK.

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Tachovsky, J.A., L.C. Haws, L.F Scott, E.S. Williams, and M. Harris. Benzene in Soft Drinks and Other Beverages: Do Measured Levels Pose a Human Health Risk? Presented at the Society for Risk Analysis' Annual Meeting. December 9–12, 2007. San Antonio, TX.

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Scanlon, B. R., **J. A. Tachovsky**, R. Slade, V. Merwade, and T. Howard. Groundwater-Surface Water Interactions Focusing on Water Quality Issues. Short course presented to the Texas Commission on Environmental Quality. 2005. Austin, TX.

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Scanlon, B. R., R. C. Reedy, **J.A Tachovsky**, and S. Nance. 2005. Impacts of the shift from natural to agricultural ecosystems archived in unsaturated and saturated zone systems in the Southern High Plains (abs.): EOS Transactions of the American Geophysical Union, v. 86, no. 52. Fall 2005 Meeting Supplement. Abstract H431-05.

Reedy, R. C., B.R. Scanlon, A. Jackson, **J.A Tachovsky**, S. Nance, and R. Balaji. 2005. Potential mobilization of arsenic and other solutes in the vadose zone through land use change in the Southern High Plains, USA (abs.): EOS Transactions of the American Geophysical Union, v. 86, no. 52. Fall 2005 Meeting Supplement. Abstract H41D-0443.

Scanlon, B. R., R.C. Reedy, **J.A. Tachovsky**, and S. Nance. 2005. Integration of physical and chemical data to assess impacts of changes from natural to agricultural ecosystems on subsurface flow and transport in semiarid regions (abs.): EOS Transactions of the American Geophysical Union, v. 86, no. 52, Fall 2005 Meeting Supplement, Abstract H34C-02.

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