

# Laurie Couture Haws, Ph.D., DABT

PRINCIPAL HEALTH SCIENTIST

## CONTACT INFORMATION

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## PROFESSIONAL PROFILE

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Dr. Laurie Haws is a Principal Health Scientist with ToxStrategies, Inc. and is based in Austin, Texas. She is a board-certified toxicologist with over 20 years of experience in the fields of toxicology and risk assessment. Dr. Haws has worked in both environmental consulting and government sectors, including serving as a manager in the Toxicology and Risk Assessment Section at the Texas Commission on Environmental Quality (TCEQ). In her position with the TCEQ, Dr. Haws was responsible for overseeing all human health risk assessment activities and was also one of the primary authors of the agency's comprehensive risk-based corrective action rule (the Texas Risk Reduction Program (TRRP) rule).

Dr. Haws has extensive experience assessing potential health risks associated with exposures to a wide variety of consumer products, food ingredients and additives, pharmaceuticals, medical devices, pesticides, industrial chemicals, and environmental agents. She has conducted biologically-based risk assessments for a number of those products, incorporating information on pharmacokinetics and mechanisms of action, and has assisted in the preparation of reports for submission to regulatory agencies such as the FDA, EPA, and California's Proposition 65 program. Dr. Haws is skilled at evaluating data concerning modes and mechanisms of action for use in both cancer and non-cancer risk assessments. She has conducted studies evaluating metabolism and disposition of a variety of halogenated aromatic hydrocarbons and has experience designing and implementing both cross-fostering and developmental toxicity studies. Dr. Haws has studied and evaluated potential health effects associated with a wide range of chemicals including lead, arsenic, mercury, PCBs, polychlorinated dibenzodioxins and dibenzofurans, PAHs, benzene, butadiene, chlorinated solvents, and trihalomethanes. She has significant experience evaluating potential human health risks associated with exposure to contaminants in environmental media (air, water, and soil) and the food chain and is knowledgeable about a number of state and federal regulatory programs designed to address the investigation and remediation of contaminated sites. Dr. Haws has significant experience working with federal, state, and local government agencies, industry and private sector businesses, legislative representatives, the media, and members of the general public. She has served on a number of scientific panels, technical workgroups, and advisory committees.

## **EDUCATION AND DEGREES EARNED**

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Ph.D., Toxicology, School of Medicine, Curriculum in Toxicology, University of North Carolina, 1990

M.S., Environmental Sciences & Engineering (Toxicology), School of Public Health, University of North Carolina, 1987

B.S., Environmental Biology (*magna cum laude*), Long Island University, 1985

## **CERTIFICATIONS**

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Diplomate, American Board of Toxicology (1994–present)

## **PROFESSIONAL HONORS/AWARDS**

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Society of Toxicology-Student Travel Award (1988, 1990)

Level III Scientific & Technological Achievement Award (National Institute of Environmental Health Sciences) (1988)

North Carolina Chapter of the Society of Toxicology-Student Travel Award (1987, 1990)

Presidential Scholarship (1983–1985)

Faculty Honors Award (1983)

Outstanding Campus Leadership Award (1983)

Beta Beta Beta Biological; Honor Society (1984–1985)

## **PROFESSIONAL ASSOCIATIONS**

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Society of Toxicology

- Risk Assessment Specialty Section, Councilor (2008–2010), Vice President-Elect (2011-2012), Vice President (2012-2013), President (2013-2014)
- Contemporary Concepts in Toxicology Committee member (2011-2013)
- Nominating Committee member (2008–2010)
- Continuing Education Committee, Chair (2006–2007), member (2004–2007)

Gulf Coast Chapter of the Society of Toxicology

Society of Risk Analysis

Regulatory Affairs Professionals Society

## **SCIENTIFIC ADVISORY PANELS, COMMITTEES, & WORKGROUPS**

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Chair, International Symposium on Halogenated Persistent Organic Pollutants, San Antonio, Texas, September 2010

U.S. Environmental Protection Agency Scientific Advisory Board Exposure and Human Health Committee (2009-present)

International Advisory Board Member, International Symposium on Halogenated Persistent Organic Pollutants, 2007–2013

Resource Expert, World Health Organization, Dioxins Toxic Equivalency Factor Review, Geneva, Switzerland, June 27–30, 2005.

STAPPA/ALAPCO Residual Risk Steering Committee (2001–2003)

USEPA-State-Tribal Risk Assessment Workshop Planning Committee (2001)

Texas Risk Reduction Program Rule Target Chemicals of Concern (COC) Workgroup (1999–2003)

Texas Risk Reduction Program Rule Chemicals of Concern (COC) Screening Workgroup (1999–2003)

Texas Risk Reduction Program Rule Representative Concentrations Workgroup (1999–2003)

Texas Risk Reduction Program Rule Exposure Factors Workgroup (1999–2003)

Texas Risk Reduction Program Rule Probabilistic Risk Assessment Workgroup (1999–2001)

Texas Commission on Environmental Quality Combustion Strategy Implementation Team (1996–2003)

EPA Workgroup on Maximum Achievable Control Technology (MACT) Standards for Hazardous Waste Combustors (1995–1998)

Federal/State Toxicology and Risk Analysis Committee (1995–2003)

Texas Medical Association Committee on the Environment (1994–1997)

Scientific Advisory Committee on Birth Defects in Texas (1994–1999)

## **SELECTED PROJECT EXPERIENCE**

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### **Human Health Risk Assessment**

Oversaw and contributed to the development of oral and inhalation toxicity values for sulfolane using benchmark dose modeling.

Currently overseeing the design and implementation of a comprehensive research program designed to assess the mode of action underlying the toxic responses induced in rats and mice following exposure to hexavalent chromium in drinking water.

Evaluated the potential human health risks associated with exposure to antimony slag used as a base-material for a hike and bike trail at a park in Southern United States. This project included developing receptor-specific “acceptable levels” for antimony in soil for several different receptors including park maintenance workers, runners, bike riders, and playing children. The acceptable levels incorporated site-specific oral and dermal bioaccessibility values.

Represented a state environmental regulatory agency in many meetings with federal, state, and local government agencies, the media, industry representatives, environmental consultants, legislators and members of the general public concerning a wide variety of toxicology and risk assessment issues.

Oversaw all human health risk assessment projects for a large state environmental agency.

Evaluated and interpreted toxicology data to assess potential human health risks associated with exposure to a wide variety of environmental contaminants including lead, arsenic, mercury, PCBs, dioxins and furans, PAHs, benzene, butadiene, trichloroethylene, perchloroethylene, etc.

Critically evaluated new toxicological data for 1, 3-butadiene, focusing specifically on reproductive and developmental data, as well as on data addressing the potential for carcinogenic risk associated with intermittent and short-term exposures.

Critically evaluated toxicological data supporting derivation of a site-specific reference dose for methylmercury in fish eating populations.

Critically reviewed and interpreted reproductive and developmental toxicity data for various glycol ethers in order to assess human health risk associated with exposure via drinking water. The purpose of this work was to provide technical support as a part of a litigation case involving a large industrial release of glycol ethers into a community water supply.

Oversaw and contributed to the technical review and comment on several USEPA rule and guidance document packages (e.g., Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities; MACT Rule for Hazardous Waste Combustion Facilities; RCRA Risk Management Guidance Document; Dioxin Reassessment; etc.), focusing specifically on toxicological and human health risk assessment aspects.

Served on a technical review committee charged with critically evaluating US EPA's Multimedia, Multipathway Human and Ecological Analysis for Development of Exit Criteria for the Hazardous Waste Identification Project.

Participated in the State of Texas Comparative Risk Project, the purpose of which was to prioritize environmental problems in the state.

Assessed exposure and evaluated claims of adverse effects on human health made by individuals living in the vicinity of a former wood treatment facility.

### **Persistent Organic Compounds (Dioxins, PCBs, PBDEs)**

Oversaw the review and preparation of comments on the USEPA's draft Toxicological Assessment for decaBDE.

Oversaw the design and implementation of a comprehensive study designed to measure a number of persistent halogenated aromatics (dioxins, furans, PCBs, and PBDEs) in wild-caught and farm-raised catfish from southern Mississippi. This data was ultimately used to develop both dose and risk estimates associated with the consumption of catfish from this region of the country.

Developed a state-of-the-science framework for weighting study quality and relevance for use in establishing weighted distributions of relative potency estimates for dioxin-like compounds.

Conducted a comprehensive review of the relative potency factor database originally developed by the Karolinska Institute to support the re-evaluation of the toxic equivalency factor (TEF) for PCDD/Fs and dioxin-like PCBs by the World Health Organization (WHO) in 1997. This database was ultimately updated and was subsequently used by the WHO Dioxin Toxic Equivalency Review Panel in 2005 to review the state of the science regarding the potency of dioxin-like compounds and to recommend TEFs.

Reviewed PCDD/F and metal analyses of soils collected outside of a major industrial facility in Southern Mississippi following the landfall of Hurricane Katrina to determine if these chemicals/metals posed any threat to human health and the environment.

Designed and implemented experimental studies to assess the developmental toxicity of dioxin-like compounds, focusing specifically on the effects on the kidney. The specific types of experimental studies included those that were designed to characterize the critical period of susceptibility for induction of teratogenic effects, a series of cross-fostering studies to determine the potential for induction of hydronephrosis via lactational exposure to dioxin-like compounds, and a series of studies to assess the persistence of hydronephrosis induced pre- and post-natally.

Designed protocols and carried out experiments to evaluate the chemical disposition and toxicity of octachlorodibenzo-p-dioxin (OCDD) following subchronic exposure. The specific types of studies conducted included those to determine tissue distribution, cellular and subcellular localization, clinical chemistry and hematological effects, histopathological changes, and alterations in enzymatic activities following subchronic exposure to OCDD.

### **Occupational Health**

Assessed potential exposures in a semiconductor facility to determine if there was a potential association with birth defects observed in the offspring of both male and females that had been employed at the facility. This project involved developing a database of all potential chemicals used in the facility based on review of historical purchasing records, segregating the chemicals based on departments/specific job duties, and identifying those with data/information suggestive of potential reproductive and/or developmental effects. A database was also developed for all available industrial hygiene (IH) data for the various glycol ethers used in the facility over time and various measures of representative concentrations were developed and compared to available toxicological and occupational benchmarks. A historical timeline of changes in the occupational standards for the glycol ethers was also prepared. Available toxicological and epidemiological literature concerning the various glycol ethers was reviewed, focusing in particular on studies involving assessment of developmental and/or reproductive effects. Epidemiological studies of semiconductor worker populations were also reviewed, and included consideration of male-mediated effects (ie, potential effects in off-spring associated with potential exposures of fathers employed in the semi-conductor industry.)

Evaluated exposure data and medical records, in conjunction with relevant toxicological and epidemiological data, to determine whether the conduct of specific job duties while working in a facility that produced resistors could have resulted in chemical exposures that, in turn, could have lead to the development of non-small cell lung cancer in a facility worker.

Co-principle investigator on a large biomonitoring study designed to assess the levels of dioxin-like compounds in the blood serum of workers at a former secondary copper smelting facility. This involved overseeing the development of the study protocol and comprehensive exposure questionnaire, study implementation, development of applicable background blood levels, fingerprinting analyses, data analyses, and interpretation of study findings. In addition, this project involved coordinating with an external science advisory board and an institutional review board.

Evaluated biomonitoring data for dioxin-like compounds and hexachlorobenzene in workers at a primary magnesium production facility to determine if levels were similar to or different from those in the general population, as well as to determine whether the measured levels posed any threat to human health.

Collaborated with the U.S. Air Force to analyze data collected as a part of the Air Force Health Study to assess the potential association between Type 2 diabetes and TCDD serum concentrations after adjusting for known risk factors such as age, race, BMI, and family history of disease.

Reviewed medical records and other toxicological and epidemiological data to determine if exposure of a worker to methylene chloride in a bowling ball manufacturing facility could have resulted in the development of a specific type of cancer known as mycosis fungoides. Testified regarding my findings in a hearing before the Texas State Office of Administrative Hearings (SOAH).

## Site Remediation

Oversaw and contributed to the development of groundwater screening levels for sulfolane that were protective of a variety of potential household uses including drinking and inhalation exposures while showering. This project also involved developing groundwater cleanup criteria that were protective of using the groundwater to irrigate vegetable gardens and the subsequent human ingestion of those vegetables.

Oversaw and contributed to development of health-protective groundwater screening levels for several volatile organic compounds (VOCs) detected in groundwater. The primary potential exposures of interest included use of the use of the groundwater for lawn irrigation, to fill swimming pools, and the potential for vapor intrusion into buildings. Appropriate models were developed to assess each of these potential exposures and soil gas data was ultimately collected and incorporated into the model.

Served on an internal state environmental agency workgroup charged with developing rule language to implement House Bill 3152 (Municipal Setting Designations), legislation designed to address requirements for removing contaminants from groundwater.

Oversaw and contributed to the critical evaluation of, and comment on, more than 200 human health risk assessments submitted to a state environmental regulatory agency as a part of demonstrating compliance with state and federal rules and regulations governing the investigation and remediation of contaminated sites.

Provided technical support for the assessment of potential human health risks associated with use of trichloroethylene-contaminated groundwater for purposes of lawn irrigation and showering.

Contributed to the development of guidance for the evaluation of potential human health risks associated with exposures from vapor intrusion of chlorinated solvents into indoor air.

Was a primary author of a state environmental agency's comprehensive risk-based corrective action rule (Texas Risk Reduction Program (TRRP) rule), having had responsibility for the development of all aspects of the rule dealing with toxicology and human health risk assessment.

Oversaw and contributed to the development of health protective risk-based cleanup levels for over 600 contaminants for a state environmental agency.

Developed detailed technical responses to over 200 comments on a state environmental agency's comprehensive risk-based corrective action rule (Texas Risk Reduction Program (TRRP) rule).

Contributed to the development of 12 critical risk assessment guidance documents to support a state environmental agency's comprehensive risk-based corrective action rule (Texas Risk Reduction Program (TRRP) rule), and was the primary author for an additional guidance document titled *Toxicity Factors and Chemical/ Physical Parameters*.

Was responsible for reviewing human health risk assessment aspects of all 34 risk assessment guidance documents developed to support a state environmental agency's comprehensive risk-based corrective action rule (Texas Risk Reduction Program (TRRP) rule).

Lead an initiative designed to investigate the utility and potential areas of application of probabilistic techniques (e.g., Monte Carlo) across all risk assessment practice areas of a large state environmental agency.

Was the primary author of the state of Texas' guidance document titled *Implementation of the Existing Risk Reduction Rule*.

Contributed to a state environmental agency's rulemaking governing the use of composted materials, including the development of health-based End Product Standards.

## **Air**

Oversaw and contributed to the assessment of the potential impacts of natural gas exploration and production operations on air quality in communities surrounding these operations. This project involved comprehensive assessments of available air monitoring, emissions inventory, and biomonitoring data and included developing fingerprints of potential contaminants associated with these types of operations, as well as evaluation of measured and estimated air concentrations relative to relevant health benchmarks and background air concentrations.

Oversaw and contributed to the development of a GIS-based model that incorporated air monitoring data collected over a period of 15 years at 18 locations in an urban area in the Southern United States. This model was used to calculate long and short term exposure concentrations of benzene, to evaluate the potential for adverse health effects associated with the monitored concentrations of benzene, to evaluate long term trends in benzene concentrations, to evaluate the impact of an operational upset at an industrial facility, and to conduct an assessment of short term odor concerns. Presented findings of these analyses to a variety of community leaders and interested parties including the City Council, County Commissioners, local newspaper editorial staff, school boards, etc.

Critically reviewed several studies concerning air quality in an urban area in the Southern United States. This included overseeing the development of a GIS-based model that incorporated air monitoring data collected over a period of 20 years. This model was in turn 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 the area.

Critically reviewed available data to address claims that emissions from a petrochemical facility resulted in the exacerbation of existing respiratory conditions in nearby residents. This project involved evaluating the state-of-the-science concerning potential risk factors that could cause or contribute to asthma and other respiratory conditions in children, as well evaluating mobile and stationary air monitoring data for a variety of chemicals to determine the potential impact of emissions on surrounding neighborhoods.

Critically reviewed the support and technical basis for the ambient air quality standard for total suspended particulate (TSP) proposed by the New Mexico Environment Department (NMED). This project involved reviewing the historical evolution and technical basis for particulate matter (PM) standards to determine if actions taken by the State of New Mexico to develop regulations for total suspended particulate (TSP) were warranted based on concerns about potential adverse health effects.

Provided technical support for the development of a state-of-the-science approach for deriving acceptable ambient levels for air contaminants for a state environmental agency.

Researched mechanisms of action underlying benzene toxicity in order to assess potential health risks associated with intermittent exposures.

Developed guidance on evaluating indirect routes of exposure to emissions from hazardous waste combustion facilities.

Oversaw and contributed to the conduct of highly complex multipathway risk assessments for more than 25 hazardous waste combustion facilities in the State of Texas. The emphasis in these risk assessments was on the incorporation of chemical-specific and site-specific data in lieu of standard default assumptions.

Oversaw and contributed to the development of a complex model (TexRisk) used to evaluate human health risks associated with multipathway exposures to emissions from hazardous waste combustors.

Served on a technical review workgroup charged with critically evaluating USEPA's guidance document titled *Multimedia, Multipathway Human and Ecological Analysis for Development of Exit Criteria for the Hazardous Waste Identification Project*.

Served as a technical expert for the USEPA in the development of Maximum Achievable Control Technology (MACT) standards for hazardous waste combustion facilities.

Reviewed air permit applications and ambient monitoring data to assess potential human health impacts and to ensure compliance with state agency rules and regulations.

Critically reviewed US EPA's 1986 Cancer Risk Assessment Guidelines and provided comments to the National Academy of Sciences Committee on Risk Assessment of Hazardous Air Pollutants.

### **Pharmaceutical Agents/Medical Devices**

Examined the adequacy of existing preclinical toxicity data for several medical devices and subsequently prepared premarket approval (PMA) application packages.

Critically reviewed and interpreted chronic bioassay data and characterized preneoplastic and neoplastic changes for a new pharmaceutical agent. This project also involved reviewing historical control tumor incidence data to facilitate comparisons, and reviewing NTP studies to identify the spectrum of toxic effects for agents causing similar site-specific tumors in order to better understand the mechanism of action.

Quantified maximum short-term concentrations of various metals associated with rupture of a medical device in order to assess human safety.

Prepared a position paper concerning solid-state carcinogenesis, with an emphasis on relevance for implantable medical devices.

Critically reviewed and interpreted developmental toxicity and carcinogenicity studies on silicones in order to assess the potential health threat posed by an implantable medical device. The purpose of this work was to provide technical support as a part of several litigation cases.

Critically reviewed and interpreted preclinical toxicity data (acute, subchronic, and chronic), identified data gaps, and designed additional toxicity studies for an implantable medical device.

### **Food Ingredients, Additives and Contaminants**

Developed estimates of the intake of dioxin-like compounds in foods using concentration data from the USFDA's Total Diet Study and consumption rate data from the CDC's National Health and Nutrition Examination Survey (NHANES). Dietary intakes were also developed based on USDA recommendations for a health diet (MyPlate). Intakes were compared to acceptable intakes associated with toxicity values proposed by the USEPA for both cancer and non-cancer endpoints to assess the implications of implementing the use of the USEPA toxicity values across a variety of Federal programs.

Assessed potential health risks associated with exposures to nonylphenol ethoxylates in food products.

Oversaw the design and implementation of comprehensive study designed to measure the levels of benzene in non-carbonated beverages and to assess potential human health risks associated with the measured concentrations.

Critically reviewed and interpreted preclinical toxicity data (acute, subchronic, and chronic) and compiled GRAS (Generally Recognized as Safe) affirmation petitions and direct and indirect food additive petitions for new food additives.

Interpreted and summarized reproductive and developmental toxicity data, chronic toxicity data, and carcinogenicity data on ethylene oxide in order to assess human health risk associated with exposure to residues on foods.

Critically reviewed and interpreted chronic bioassay data, derived cancer potency factors, and quantified exposure in order to assess the potential human health risk associated with an additive used in animal feeds.

Prepared a weight-of-the-evidence determination concerning the carcinogenic potential of an additive in animal feed.

### **Consumer and Personal Care Products**

Assessed the potential health risks associated with exposure to fluoropolymers in a grout sealer used for household purposes.

Critically reviewed data concerning exposures to bisphenol in a range of consumer products and assessed associated toxicity data in the scientific literature.

Critically reviewed and interpreted chronic bioassay and pharmacokinetic data for a proprietary ingredient of a consumer product. This project also involved deriving dermal absorption factors for the proprietary ingredient in order to estimate background exposures.

Prepared a biologically-based risk assessment for a proprietary cosmetic ingredient, with an emphasis on the role of secondary mechanisms of action for the tumorigenic response.

Assessed potential developmental toxicity risks associated with exposure to several consumer and personal care products subject to warning requirements of California's Proposition 65.

Prepared a biologically-based risk assessment, incorporating pharmacokinetic and pharmacodynamic data, to evaluate potential exposures to chloroform in a consumer product.

### **Pesticides**

Evaluated developmental toxicity data from a series of multigeneration and cross-fostering studies with dimethoate to determine if fetal deaths were due to direct action of the chemical or were the result of a maternal effect. This work was done in support of the re-registration of dimethoate and involved presenting our findings to the USEPA Science Advisory Panel.

Prepared a biological justification that thyroid tumors induced by a specific pesticide occurred through a secondary mechanism of action and, therefore, exhibited a threshold.

### **MANUSCRIPTS**

Thompson, C.M., D.M. Proctor, M. Suh, **L.C. Haws**, C.D. Hebert, J.F. Mann, H.G. Shertzer, J.G. Hixon and M.A. Harris. Comparison of the Effects of Hexavalent Chromium in the Alimentary Canal of F344 Rats and B6C3F1 Mice Following Exposure in Drinking Water: Implications for Carcinogenic Modes of Action. *Toxicol Sci.* October 19, 2011. doi:10.1093/toxsci/kfr280.

Thompson, C.M., D.M. Proctor, **L.C. Haws**, C.D. Hebert, S.D. Grimes, H.G. Shertzer, A.K. Kopec, J.G. Hixon, T.R. Zacharewski and M.A. Harris. 2011. Investigation of the Mode of Action Underlying the Tumorigenic Response Induced in B6C3F1 Mice Exposed Orally to Hexavalent Chromium. *Toxicol Sci.* 123(1): 58-70

Thompson, C.M., **L.C. Haws**, M.A. Harris, N.M. Gatto and D.M. Proctor. 2011. Application of the U.S. EPA Mode of Action Framework for Purposes of Guiding Future Research: A Case Study Involving the Oral Carcinogenicity of Hexavalent Chromium. *Toxicol Sci.* 119(1): 20-40.

Tachovsky, J.A., J.D. Urban, D.S. Wikoff, **L.C. Haws** and M.A. Harris. 2010. 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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DeSesso, J.M., R.E. Watson, C.L. Keen, K.P. Hazelden, **L.C. Haws**, and A.A. Li. 2009. Analysis and integration of developmental neurotoxicity and ancillary data into risk assessment: a case study of dimethoate. *J Toxicol Environ Health A*. 72(2): 94-109.

Scott, L.L.F., Staskal, D.F., Williams ES, Luksemburg WJ, Urban JD, Nguyen LM, **Haws LC**, Birnbaum LS, Paustenbach DJ, Harris MA. 2009. Levels of polychlorinated dibenzo-p-dioxins, dibenzofurans, and biphenyls in southern Mississippi catfish and estimation of potential health risks. *Chemosphere*. 74(7): 1002-10.

Urban, J.D., J.A. Tachovsky, D.F. Staskal, **L.C. Haws**, and M.A. Harris. 2009. Assessment of Human Health Risks Posed by Consumption of Fish from the Lower Passaic River, New Jersey. *Sci Total Environ*. 408(2): 209-24.

Donovan, E.P., D.F. Staskal, K.M. Unice, J.D. Roberts, **L.C. Haws**, B.L. Finley, and M.A. Harris. 2008. Risk of Gastrointestinal Disease Associated with Exposure to Pathogens in the Sediments of the Lower Passaic River. *Appl Environ Microbiol*. 74:1004–1018.

**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 Science*. 73(4), T33–41

Scott, L.L.F., M. Harris, K.M. Unice, P. Scott, L.M. Nguyen, **L.C. Haws**, and D. Paustenbach. 2008. Addendum to: Evaluation of PCDD/F and dioxin-like PCB serum concentration data from the 2001–2002 National Health and Nutrition Examination Survey of the United States population. *J Exp Sci Env Epidemiol*. 1–9.

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**Haws, L.**, S. Su, M. Harris, M.J. DeVito, N.J. Walker, W.H. Farland, B. Finley, and L.S. Birnbaum. 2006. Development of a refined database of mammalian relative potency estimates for dioxin-like compounds. *Toxicol Sciences*. 89(1):4–30.

Van den Berg, M., L. Birnbaum, M. Denison, M. De Vito, W. Farland, M. Feeley, H. Fiedler, H. Hakansson, A. Hanberg, **L. Haws**, M. Rose, S. Safe, D. Schrenk, C. Tohyama, A. Tritscher, J. Tuomisto, M. Tysklind, N. Walker, and R.E. Peterson. 2006. The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. *Toxicol Sciences*. 93(2):223–241.

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**Haws, L.C.**, B.A. Jackson, D. Turnbull, and W.E. Dressler. 1994. A Comparison of two approaches for assessing human cancer risk from disperse blue 1. *Reg Toxicol Pharmacol*. 19:80–96.

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Couture-**Haws, L.**, M.W. Harris, A.C. Lockhart, and L.S. Birnbaum. 1991. Evaluation of the persistence of hydronephrosis induced in mice following in utero and/or lactational exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). *Toxicol Appl Pharmacol*. 107:402–412.

Couture-**Haws, L.**, M.W. Harris, M.M. McDonald, A.C. Lockhart, and L.S. Birnbaum. 1991. Hydronephrosis in mice exposed to TCDD-contaminated breast milk: identification of the peak period of sensitivity and assessment of potential recovery. *Toxicol Appl Pharmacol*. 107:413–428.

Frankos, V.H., D.F. Schmitt, **L.C. Haws**, A.J. McEvily, R. Iyengar, S.A. Miller, I.C. Munro, F.M. Clydsdale, A.L. Forbes, and R.M. Sauer. 1991. Generally recognized as safe (GRAS) evaluation of 4-hexylresorcinol for use as a processing aid for the prevention of melanosis in shrimp. *Reg Toxicol Pharmacol*. 14:202–212.

**Couture, L.A.**, M.W. Harris, and L.S. Birnbaum. 1990. Characterization of the peak period of sensitivity for the induction of hydronephrosis in C57BL/6N mice following exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin. *Fundam Appl Toxicol*. 15:142–150.

**Couture, L.A.**, M.W. Harris, and L.S. Birnbaum. 1989. Developmental toxicity of 2,3,4,7,8-pentachlorodibenzofuran (4-PeCDF) in the Fischer 344 rat. *Fundam Appl Toxicol*. 12:358–366.

Birnbaum, L.S., **L.A. Couture**, and M.R. Elwell. 1989. Subchronic effects of exposure to Octachlorodibenzo-p-dioxin (OCDD). *Chemosphere*. 18(1–6):389–390.

**Couture, L.A.**, M.R. Elwell, and L.S. Birnbaum. 1988. Dioxin-like effects observed in male rats following exposure to Octachlorodibenzo-p-dioxin (OCDD) during a 13-week study. *Toxicol Appl Pharmacol*. 93:31–46.

Birnbaum, L.S. and **L.A. Couture**. 1988. Disposition of Octachlorodibenzo-p-dioxin (OCDD) in male rats. *Toxicol Appl Pharmacol*. 93:22–30.

## ABSTRACTS AND PRESENTATIONS

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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.

**Haws, L.C.**, Fitzgerald, L., Burkhalter, B., Harris, M., Wikoff, D.S. Assessment of the US EPA's proposed toxicological values for TCDD for regulation of dioxin-like compounds in foods: bridging the science divide in a global market. Presented at Dioxin 2011, August 21-25, 2011. Brussels, Belgium.

Wikoff, D.S., Thompson, C., Walker, N., DeVito, M., Harris, M., Birnbaum, **L. Haws**, L. Derivation of relative potency estimates using benchmark dose modeling: a case study with TCDF. Presented at Dioxin 2011, August 21-25, 2011. Brussels, Belgium.

Fitzgerald, L., B. Burkhalter, J. Urban, D. Staskal, M. Harris, and **L. Haws**. VOC serum levels in the general U.S. population: An analysis of the 2003-2004 NHANES dataset. Presented at the Society of Toxicology's 50th Annual Meeting, March 6-10, 2011. Washington, D.C.

**Haws, L.**, D. Proctor, C. Thompson, and M. Harris. Research Plan to Fill Data gaps in the Mode of Action for Cancer Risk Assessment of Hexavalent Chromium in Drinking Water. Presented at the Society of Toxicology's 50th Annual Meeting, March 6-10, 2011. Washington, D.C.

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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.

Urban, J., L. Fitzgerald, B. Burkhalter, D. Staskal, M. Harris, and **L. Haws**. BTEX serum levels in the general U.S. population: An analysis of 2003-2004 NHANES dataset. 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.** Biomonitoring - A Tool for Assessing Community Exposures to Air Toxics. Presented at the Air Quality 2010 conference, hosted by the University of Texas School of Law, on November 19, 2010.

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**Haws, L.** Biomonitoring: The Circle of Life. Presented in the Oil and Gas special session, at the 22nd Annual Texas Environmental Superconference, August 5-6, 2010, Austin, TX.

Tachovsky, J.A. and **L. Haws**. Application of principal components analysis and sequential gaussian simulation to a comprehensive soil sampling dataset to predict PCDD/F concentrations in Midland, MI. Presented at Dioxin 2010, September 12-17, 2010, San Antonio, TX.

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.

Tachovsky, J.A. and **L. Haws**. Geostatistical estimation of soil PCDD/F TEQ using Sequential Gaussian Simulation and the aggregation of results in Midland, MI. Presented at the Society for Risk Analysis annual meeting, December 5-8, 2010, Salt Lake City, UT.

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