Jennifer Bare, B.S.

SUPERVISING ENGINEER

CONTACT INFORMATION

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PROFESSIONAL PROFILE

Ms. Jennifer Bare is an environmental engineer with nine years of scientific consulting experience. She specializes in quantitative exposure modeling and reconstruction, human health risk assessment, chemical transport analysis, and data management. She has assessed risks associated with consumer, community, and occupational exposures to a variety of products and chemicals. She focuses on designing and implementing chemical exposure models for volatile and semi-volatile organic compounds, particulates, and metals. Specifically, she has modeled and re-created exposures from inhalation (near-field, far-field, and vapor intrusion), dermal, hand-to-mouth, and ingestion pathways. Additionally, she has experience in deriving chemical toxicity criteria through dose-response modeling, determining exposure and background levels using statistical analyses, and understanding uncertainty and sensitivity using probabilistic modeling (e.g., Monte Carlo).

Ms. Bare has specific expertise in reconstructing and predicting community exposures to industrial emissions using United States Environmental Protection Agency (EPA) air dispersion models. She routinely assists clients with products and chemicals that are regulated under California's Proposition 65 and EPA's Toxic Substances Control Act (TSCA). She also regularly assists with estimating exposures associated with complex contaminated sites and emitters, such as manufactured gas plants (MGPs) and chemical plants.

EDUCATION AND CERTIFICATIONS

2013 B.S., Environmental Engineering, The Ohio State University

2013 Engineer Intern (E.I.) Certification, The State of Ohio

PROFESSIONAL ACTIVITIES

2014—Present	Society for Risk Analysis (SRA)
2020—Present	International Society of Exposure Science (ISES)
2021—Present	Society of Environmental Toxicology and Chemistry (SETAC)

SELECTED PROFESSIONAL EXPERIENCE

Environmental Fate & Transport Modeling

Managed a project that involved evaluating the contributions of several sources of particulate matter and hazardous air pollutants surrounding an industrial park. This work included using the AP-42 Emission Factor Chapters to estimate emissions of mobile and non-mobile sources, relying on regulatory management systems of permitted sources, and performing literature searches of general agricultural pollution. The EPA AirToxScreen and National Emissions Inventory (NEI) were reviewed to identified potential area sources. This work also required synthesizing and summarizing large sets of fenceline meteorological and particulate matter data, to understand temporal and spatial wind and particulate-matter trends. The project culminated in conducting air dispersion modeling to predict site-specific, off-site impacts of particulate matter.

Performed blood lead modeling using IEUBK for a community with varying levels of exposure to lead in soil, dust, ambient air, and drinking water. This work was used to understand the impact to overall risk by route of exposure.

For several residential and commercial/industrial sites, predicted site-specific attenuation factors and indoor air concentrations from vapor intrusion using EPA's and PA DEP's Johnson and Ettinger models. Predicted air concentrations were used to estimate health risks from vapor intrusion–related exposures. Chemicals of interest included several chlorinated compounds and other volatile organic compounds. Several sites relied on the screening levels provided by the Human and Ecological Risk Office of the California Department of Toxic Substances Control (DTSC HERO), the Regional Water Quality Control Board (RWQCB), and EPA.

Performed screening air dispersion modeling of a prioritized chemical using EPA's AERSCREEN in preparation for a EPA TSCA risk evaluation. Included a comparison to background concentrations and human health benchmarks.

Provided technical support for a Health Risk Assessment (HRA) for a Specific Plan, according to Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA) guidelines. Support included evaluating the HRA approach for assessing health risks from construction and operational activities.

Developed and directed multiple Proposition 65 assessments that evaluated potential community exposures to chemicals emitted from industrial operations. Collected site-specific information and synthesized data for air dispersion modeling using EPA's screening model AERSCREEN. Estimated exposures for nearby community receptors of concern, refining the model and model assumptions as necessary. Several chemicals assessed did not have State-defined Safe Harbor Levels (SHLs) to serve as the basis for assessing risk, so SHLs were derived or acceptable exposure levels were estimated or identified.

Managed an air dispersion modeling effort to assess odor from multiple turbines at a military facility in the surrounding community. Determined chemicals emitted from turbines using fuel data and compiled corresponding odor thresholds from various EPA sources.

Estimated occupational and community exposure to asbestos from facilities that historically manufactured or used asbestos-containing materials. Used EPA's refined air dispersion model, AERMOD, to account for variable emission rates from multiple area, fugitive, and point sources of asbestos. Airborne asbestos concentrations were predicted for thousands of potential receptor locations.

Estimated potential exposures to volatile organic compounds (VOCs); nitrogen oxides (NOx); and benzene, toluene, ethylbenzene, and xylenes (BTEX) from a natural gas compression facility. Performed air dispersion modeling with AERMOD and conducted an extensive review of site-specific emissions data and regulatory reports. Supported preparation of expert reports using model results to reconstruct exposures and assess effects on human health.

As part of an industry initiative called the Tire Industry Project, participated on a team that evaluated the environmental fate of chemicals formulated in tire and road wear particles (TRWPs). The team analyzed column leaching and sediment incubator study data to evaluate analytical repeatability, quantify the mass of chemical leached, and analyze the environmental fate and transport of TRWP constituents. The team studied TRWP-associated chemicals with various physical characteristics, as well as their changes from weathering.

Exposure and Risk Assessment

Assisted with a quantitative exposure evaluation of BPA in containers under California's Proposition 65. This assessment included estimating hand-to-mouth and dermal exposures using product testing data.

Developed training materials to assist in chemical exposure and risk assessments of cosmetics. The training materials included an Excel-based tool with a screening-level exposure assessment module and a module that incorporated the results of a higher tier exposure model (i.e., ConsExpo) into automated margin-of-safety calculations. The tool was accompanied by a user guide and presentation.

Reviewed concentration data and exposure assessments of benzophenone in consumer products from published literature and regulatory risk assessments, for the purpose of conducting a cumulative risk assessment. Work involved identifying data gaps and key uncertainties.

Assisted with a tiered risk assessment of consumption of crops that were irrigated with contaminated groundwater. Methods included estimating plant uptake of various organic and inorganic compounds, as well as metals and radionuclides, and retrieving consumption rates from the Food Commodity Intake Database (FCID).

Estimated acceptable concentrations of chemicals in pesticide consumer products using EPA's Standard Operating Procedures (SOPs) for Residential Pesticide Exposure Assessment. Assessed handler and post-handler exposures for several product uses.

Developed an Excel-based job exposure matrix that recreated cumulative exposures for thousands of employees and job titles.

For several litigious and regulatory sites and exposure scenarios, predicted vapor intrusion exposures to many organic compounds in soil gas and groundwater. Work has included assessing site-specific sub-surface conditions, compiling regulatory screening levels (EPA, DTSC, RWQCB), estimating chemical-specific attenuation factors, and modeling indoor air concentrations and subsequent risks.

Compiled and evaluated predicted exposure assessments and risk analyses from the EPA National Air Toxics Assessment (NATA), National Emissions Inventory (NEI), and AirToxScreen for several communities and chemicals in the United States.

Developed an Excel-based margin-of-safety (MOS) tool to assist in cosmetic product safety assessments. This work included a Tier 1 inhalation model, integration of a refined model software (ConsExpo), and implementation of the tool via an external training.

Assisted in implementing a regulatory risk assessment of an industrial emitter under RCRA. Predicted community air concentrations using AERMOD per the approved protocol.

Performed a screening-level community exposure assessment of industrial emissions of ethylene oxide in preparation for regulatory compliance. This assessment included modeling receptor and monitor-specific concentrations in AERMOD and comparing these predicted concentrations to background levels.

Provided assistance to a trade association with stakeholders of a chemical undergoing a TSCA existing-chemical risk evaluation. Projects included a screening-level community exposure assessment of industrial emissions, providing comments to EPA on the occupational risk evaluation scope, and assisting with industrial hygiene data management.

Reviewed the 1,4-dioxane Draft TSCA Risk Evaluation for a trade association. Commented specifically on EPA's occupational exposure assessment of the inhalation and dermal pathways. Provided recommendations for future assessments specific to the Monte Carlo analysis and dermal exposure model approach.

Commented on a Monte Carlo analysis in a community exposure and risk assessment of airborne contaminants. Reviewed the appropriateness of using this probabilistic tool and the effectiveness of the analyses implemented.

Performed several consumer exposure assessments for businesses evaluating warning compliance under California Proposition 65. Consumer products evaluated have included an HVAC equipment line, retail shelving equipment, tarps and hardware, shoes, and a luxury furniture line. Exposures to metals (e.g., lead, hexavalent chromium), organic compounds (e.g., phthalates, 2-MBT, solvents), and particulates have been evaluated. For each defined consumer scenario, inhalation, dermal, direct ingestion, and hand-to-mouth pathways have been assessed qualitatively or quantitatively. Many exposure assessments have involved developing an analytical testing strategy for consumer product lines. Finally, when necessary, safe harbor levels (NSRL, MADL) have been derived using Proposition 65 guidance (e.g., 2-MBT, cumene, 1-BP).

For litigation, reviewed a Proposition 65 analysis of talc in a consumer product line. Strategically reviewed the assessment's quantitative exposure methods and assumptions and evaluated the appropriateness of these under Proposition 65.

Developed Proposition 65 risk assessments for multiple confidential product lines. Exposure pathways included inhalation, dermal contact, and ingestion via hand-to-mouth transfer. Also derived NRSLs and MADLs for chemicals that did not have State-defined values. Developed a user-friendly risk assessment tool in Excel that evaluated exposures and risks for various product types, consumer use, and chemical selection. The tool integrated several inhalation exposure models from AIHA IHMod.

Provided regulatory (REACH, Proposition 65) support to an international clothing company. Support has included a prospective assessment of DEHP in rubber shoe soles. Exposures and risk were estimated using Proposition 65 guidance and ECHA's ECETOC TRA model. Assisted the company in addressing a REACH violation of hexavalent chromium in a leather shoe product. Critically reviewed ECHA's risk assessment of hexavalent chromium in leather products, particularly the basis of the REACH restriction limit. As a result, performed an updated regulatory exposure assessment and toxicological evaluation.

Under the EU's REACH regulations, reviewed and synthesized data from literature relating to medium-chain chlorinated paraffins (MCCPs). Summarized the measured concentrations of MCCPs in various environmental media—sediment, soil, and biota—and critically evaluated the data set.

Estimated warehouse workers' exposures to irritants resulting from accidental scenarios. Used IHMod to model near-field/far-field exposures under several scenarios to re-create exposures and predict when exposures did not exceed identified health benchmarks.

Allocated the environmental liability of parties involved with a former battery manufacturing facility using historical data and information. Work included an assessment of allocation methods used previously for the site.

Estimated a child's potential exposure to chemicals in inks and adhesives through incidental oral contact. Conservative exposure scenarios included ingestion and saliva migration. The average daily intake of chemicals was determined to be negligible.

Managed an evaluation of the approach used to assess risks associated with a former manufactured gas plant (MGP) site in Australia. Used the results in mediation to determine the extent of remediation needed to reduce

potential human and environmental health risks from the site. Specific areas of interest included the exposure scenarios and assumptions used in the assessment.

Evaluated historical effluent discharge from a former battery manufacturing facility. The assessment included a review of claims regarding the toxicology of the effluent and potential environmental exposures.

Member of a team conducting a human health risk assessment of metals in pond water and sediment. Developed a conceptual site model that included ingestion and dermal exposure to metals during recreational fishing, wading, and accidental immersion. Performed risk calculations for background levels of metals. Overall, concluded that no increased risk was associated with the exposures to pond water and sediment.

Participated in sampling California wines to compare arsenic levels in wine to human health criteria, including wine- and water-specific international and domestic arsenic health standards. The comparison factored in the differences in wine and water consumption rates.

Assisted in a human health risk assessment of potential inhalation exposures to chemicals during the remediation of former MGP sites. Performed air dispersion modeling to compare potential risks associated with remediation to fenceline concentration objectives calculated to protect nearby receptors.

Evaluated risk associated with ingestion of vegetable-based carbon black in lollipops. Researched international and domestic regulations pertaining to vegetable-based carbon black in food and the compound's toxicity from ingestion. Calculated exposures for the US population (children) and compared those values to estimated total dietary exposures to vegetable carbon black. Findings indicated no increased risk from ingestion of the carbon black in lollipops due to the lack of PAHs and low exposure levels.

Assisted in evaluating potential risk from PCBs in drinking water during multiple phases of remediation. Evaluated other sources of risk that included disinfection by-products and radium.

Completed an exposure assessment for long-chain chlorinated paraffins (LCCPs) manufactured in the United States. Reviewed air, water, landfill, and incineration emission factors and compiled data for use in the ECETOC Targeted Risk Assessment (TRA) model for compliance with REACH.

Performed a quality assurance review of extended safety data sheets (eSDSs) for four phosphates (DDPP, DPDP, 2-EHDPP, TDP). Verified the accuracy of predicted environmental concentrations and risk characterization ratios for multiple human health and environmental exposure scenarios.

Developed a tool that modeled lifetime asbestos exposures to create a threshold ranking distribution based on several inputs. A Monte Carlo simulation was incorporated in the model to assess the uncertainty in exposure intensity throughout a worker's career.

Statistical Analysis

Cleaned a large database of PCB sampling measurements from a variety of environmental media. Supported litigation team by building summary statistics formulations for use in current and future matters.

Built a database that handled and cleaned large data sets of liquid and aerosol ENDS product testing results. Also created a framework for performing descriptive summary statistics on the results for use in human health risk assessments.

Helped evaluate a coal-ash facility's state regulatory compliance by conducting statistical analysis of groundwater data. Chemicals of concern included arsenic, boron, iron, manganese, selenium, thallium, and total dissolved solids. Analysis included various methods outlined in the EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance. Specifically, employed ProUCL and R to determine background concentrations and identify outliers, data distributions, and EPCs.

Reviewed and commented on OSHA's justification for current sampling and analytical methods used to measure respirable crystalline silica (RCS). Assessed the ability to accurately measure exposures at the proposed

occupational permissible exposure limit (PEL) of 50 µg/m^3 and at a corresponding action level of 25 µg/m^3. Work included an assessment of OSHA's comments in the Notice for Proposed Rulemaking for an Occupational Exposure to Crystalline Silica standard and Preliminary Economic Analysis, statistical analysis of available data in R, and a literature review of sampling and analytical methods for RCS.

COMPUTER AND LANGUAGE SKILLS

AERMOD, AERSCREEN, SCREEN3, AIHA IHMod and SkinPerm, ECETOC TRA, Johnson and Ettinger, ChemSTEER, EpiSuite, ProUCL, BMDS, R

PUBLICATIONS

Kramer A, Vivanco S, **Bare J**, Panko J. 2025. Analysis of EPA air toxics monitoring data and tools for use in general population exposure assessments: Using acrylonitrile as a case study. J Air Waste Manag Assoc 75(3):181-197; doi: 10.1080/10962247.2024.2438793. PMID: 39660961.

Lipworth L, Panko JM, Allen BC, Mumma MT, Jiang X, Vincent MJ, **Bare JL**, Antonijevic T, Vivanco SN, Marano DE, Suh M, Cohen S, Mittal L, Proctor DM. 2025. Lung cancer mortality among aircraft manufacturing workers with long-term, low-level, hexavalent chromium exposure. J Occup Environ Hyg 22(3):214-227; doi: 10.1080/15459624.2024.2439817

Racz L, Gauthier A, **Bare J**, Heintz M, Feifarek D, Kennedy S, Panko J. 2024. Assessment of perfluorocarboxylic acids in fluorinated high-density polyethylene containers and estimation of potential non-cancer risks associated with anticipated use scenarios. Regul Toxicol Pharmacol 147:105560

Massarsky A, Donnell MT, Binczewski NR, Chan K, Dinh D, **Bare JL**, Unice KM. 2022. Methodology for exposure and health risk screening of phthalates potentially present in fabric face coverings. Hum Ecol Risk Assess 28:184–204.

Scott PK, Abramson MM, **Bare JL**, Barlow CA. 2019. Air dispersion modeling for historical community exposure reconstruction: An evaluation of the approach and its uncertainties. EM-Mag Environ Mgrs, January.

Drechsel DA, Barlow CA, **Bare JL**, Jacobs NF, Henshaw JL. 2017. Historical evolution of regulatory standards for occupational exposures to industrial talc. Regul Toxicol Pharmacol 91:251–267.

Pierce JS, Abelmann A, Lotter JT, Ruestow PS, Unice KM, Beckett EM, Fritz HA, **Bare JL**, Finley BL. 2016. An assessment of formaldehyde emissions from laminate flooring manufactured in China. Regul Toxicol Pharmacol 81:20–32.

Paustenbach DJ, Insley AL, Maskrey JR, **Bare JL**, Unice KM, Conrad VB, Iordanidis L, Reynolds DW, DiNatale KD, Monnot AD. 2016. Analysis of total arsenic content in California wines and comparison to various health risk criteria. Am J Enol Viticult 67(2):179–187.

Unice KM, **Bare JL**, Kreider ML, Panko JM. 2015. Experimental methodology for assessing the environmental fate of organic chemicals in polymer matrices using column leaching studies and OECD 308 water/sediment systems: Application to tire and road wear particles. Sci Tot Environ 533:476–487.

BOOK CHAPTERS

Hirani RN, **Bare JL**, Mathis C. 2024. Health risk assessment of consumer products: Case studies of DEHP exposure from disposable plastic packaging and formaldehyde exposure from a residential couch. Chapter 11 in: Paustenbach DJ (ed), Human and Ecological Risk Assessment: Theory and Practice, Third Edition. Wiley, ISBN: 978-1-119-74296-8, pp. 499–524.

PRESENTATIONS AND POSTERS

Gauthier A, **Bare J**, Kramer M. Tools and tips for exposure assessment throughout the product development life cycle. Education session, PSX 2024, October 2024.

Bare J, Kennedy SB, Feifarek D, Panko J. Quality and reliability evaluation of 6PPD-quinone surface water occurrence data and considerations for use in risk assessment. Abstract 4.22.P-Mo-119, Society of Environmental Toxicology and Chemistry, 45th Annual Meeting, Fort Worth, TX, October 2024.

Bare J, Vivanco, S, Panko J. Example framework for chemical additive replacement prioritization in a circular economy for plastics: Human health perspective. Poster at Society of Environmental Toxicology and Chemistry, 43rd Annual Meeting, Pittsburgh, PA, November 2022.

Bare JL, Maskrey JR, Hallett LA, Hamaji CM, Unice KM. 2019. Qualitative review of recent EPA TSCA occupational inhalation exposure assessments: Recommendations for future assessments. Abstract P.122. Poster Presentation at Society for Risk Analysis (SRA) Annual Meeting, Arlington, VA, December 2019.

Bare JL, Novick RM, Maskrey JR, Unice KM. Screening air dispersion modeling approach: Prop 65 community exposure assessments for industrial emitters. Platform Presentation at Air and Waste Management Association's (AWMA) Annual Conference and Exhibition: Conference Proceedings, Quebec City, Quebec, June 2019.

Abramson MM, **Bare JL**, Barlow CA, Scott PK. 2018. Evaluation of the uncertainties associated with the use of air dispersion modeling to estimate historical community exposure from manufacturers of asbestos-containing products. Platform Presentation at Air and Waste Management Association's (AWMA) Annual Conference and Exhibition: Conference Proceedings, Hartford, CT, June 2018.

McMenamy C, Jacobs N, **Bare JL**, Keenan JJ. 2018. Potential exposure to hydrogen fluoride from a thermal runaway event in an airplane cockpit. Abstract #653. Poster Presentation at American Industrial Hygiene Conference & Exposition (AIHce), Philadelphia, PA, May 2018.

Bare JL, Abramson MM, Maskrey JR, Manning CM, Keenan JJ. 2018. Proposition 65 risk assessment model framework for chemically-complex consumer products. Abstract #3525. Poster Presentation at Society of Toxicology (SOT) Annual Meeting, San Antonio, TX, March 2018.

Bare JL, Abramson MM, Barlow CA, Scott PK. 2017. Use of air dispersion modeling to estimate historical community exposure from manufacturers of asbestos-containing products. Abstract P.96. Poster Presentation at Society for Risk Analysis (SRA) Annual Meeting, Arlington, VA, December 2017.

Jacobs N, **Bare JL**, McMenamy C, Keenan JJ. 2017. Potential chemical exposures following thermal runaway in a lithium ion battery. Abstract #614. Poster Presentation at American Industrial Hygiene Conference & Exposition (AIHce), Seattle, WA, June 2017.

Hollins DM, Scott PK, **Bare JL**, Barlow CA, Nembhard M, Maskrey JR, Paustenbach DJ. 2017. Estimating asbestos emissions from former industrial sites and estimating resulting airborne concentrations in the surrounding community: A review of methodologies. Abstract #3248. Poster Presentation at Society of Toxicology (SOT) Annual Meeting, Baltimore, MD, March 2017.

Keenan JJ, **Bare JL**, McMenamy C, Chapman A, Miller E. 2017. Screening-level risk assessment of hydrogen fluoride exposure resulting from a thermal runaway event on an aircraft. Abstract #2829. Poster Presentation at Society of Toxicology (SOT) Annual Meeting, Baltimore, MD, March 2017.

Lotter J, Unice KM, Ruestow PS, Abelmann A, Fritz HA, Beckett E, **Bare JL**, Pierce JS. 2016. Formaldehyde emissions from small chamber testing of laminate flooring and comparison to exposure modeling. Podium Presentation at American Industrial Hygiene Conference & Exposition (AIHce), Baltimore, MD, May 2016.

Fritz HA, Lotter J, Abelmann A, Ruestow PS, Beckett E, Unice KM, **Bare JL**, Pierce JS. 2016. Evaluation of diurnal variations in formaldehyde concentrations following installation of laminate flooring using real-time sampling. Poster Presentation at American Industrial Hygiene Conference & Exposition (AIHce) Baltimore, MD, May 2016.

Pierce JS, Abelmann A, Ruestow P, Lotter J, Beckett E, Fritz HA, **Bare JL**, Unice KM. 2016. Assessment of indoor formaldehyde concentrations following the installation and removal of laminate flooring. Poster Presentation at American Industrial Hygiene Conference & Exposition (AIHce), Baltimore, MD, May 2016.

Ruestow PS, Unice KM, Lotter J, Abelmann A, Fritz HA, Beckett E, **Bare JL**, Pierce JS. 2016. Time trends in formaldehyde emissions from laminate flooring products after installation. Poster Presentation at American Industrial Hygiene Conference & Exposition (AIHce), Baltimore, MD, May 2016.

Pierce JS, Abelmann A, Ruestow PS, Lotter J, Beckett E, Fritz HA, **Bare JL**, Unice KM. 2016. Assessment of indoor formaldehyde concentrations following the installation and removal of laminate flooring. Abstract #1689. Poster Presentation at Society of Toxicology (SOT) Annual Meeting, New Orleans, LA, March 2016.

Unice KM, **Bare JL**, Kreider ML, Panko JM. 2015. Evaluation of leachate from tire and road wear particles (TRWP) upflow percolation column tests. Poster Presentation at Society of Environmental Toxicology and Chemistry (SETAC) North America 36th Annual Meeting, Salt Lake City, UT, November 2015.