

Stephanie Vivanco, M.P.H.

SENIOR SCIENTIST I

CONTACT INFORMATION

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PROFESSIONAL PROFILE

Stephanie Vivanco is a Senior Scientist I in ToxStrategies' Orange County, California, office. Ms. Vivanco is an environmental health scientist with experience in human health risk assessment, chemical and toxicological regulatory compliance (including California Proposition 65), consumer product stewardship, and industrial hygiene (IH). She has performed risk assessments to evaluate the potential for adverse health effects associated with the presence of a range of industrial and naturally occurring constituents in soil, air, and water. Her field work in various IH and environmental investigations has included indoor air and soil vapor sampling, personal exposure sampling of workers, employee noise dosimetry, and mold/moisture sampling. She is proficient in the use of ESRI Geographic Information System (GIS) ArcView, as well as EPA's ProUCL software, the Johnson and Ettinger model, and EPA's Benchmark Dose software. Ms. Vivanco is bilingual in English and Spanish.

EDUCATION AND DEGREES EARNED

- 2012 University of California, Los Angeles
Master of Public Health, Environmental Health Sciences
- 2010 Loyola Marymount University, Los Angeles, California
Bachelor of Science, Biology

PROFESSIONAL ASSOCIATIONS

International Society of Exposure Science

- Ethics Committee (2021–present)

SELECTED PROFESSIONAL EXPERIENCE

Human Health Risk Assessment

Evaluated odor-driving chemicals at a former industrial and oilfield-waste disposal facility (landfill) and compared odor thresholds against acute, intermediate, and chronic toxicity criteria to determine whether the detection of odor could be considered an indication of the potential for adverse health outcomes. Calculated margins of safety for chemicals measured in ambient air and assessed their potential for chemical emissions and potential risk to the off-site neighboring community.

Assembled the available and current scientific information that characterizes the potential for human health risk associated with brake-wear particles, a non-exhaust vehicle emission. Conducted a targeted literature search of the scientific published literature, as well as publications and reports from government agencies and international organizations, such as the UN Particle Measurement Program (PMP) Informal Working Group, to identify relevant data. Prepared a state-of-knowledge report with respect to exposure and hazard information related to brake-wear particles in the environment.

Conducted a risk-based screening assessment of post-excavation soil confirmation samples at a Nevada site in general accordance with the requirements of the Nevada Division of Environmental Protection (NDEP). This risk-based screening assessment evaluated health risks associated with potential future exposure to residual levels of asbestos, organochlorine pesticides, and dioxins/furans detected in post-excavation confirmation sidewall and floor soil samples. Excess cancer risks were estimated for a future construction worker, commercial/industrial worker, and resident.

Calculated ambient air monitor concentration objectives (MCOs) for former manufactured gas plant (MGP) sites. MCOs represent the concentrations of benzene, ethylbenzene, benzo(a)pyrene, and naphthalene to which nearby community members may be exposed safely during excavation and remediation of the former MGP site. Used conservative exposure assumptions consistent with federal and state EPA guidelines and identified the most relevant community receptors that are assumed to be exposed to site-related chemicals via air transport during remediation. Established exposure scenarios for each community receptor type, which included site-specific factors such as exposure time and exposure frequency according to the duration of remediation at the former MGP.

Provided human health risk assessment support for a Superfund site that was an abandoned copper sulfate and sulfur mine. Developed risk calculation spreadsheets for unique receptors, including a trespasser, recreational visitor, forager, and a Tribal member. Calculation spreadsheets included multiple chemicals, multiple media (soil, surface water, sediment, plants, and wildlife), and multiple exposure pathways. Also supported efforts to develop site-specific background concentrations for various media.

Assembled environmental risk reports in order to evaluate the potential human health risks associated with environmental applications of steel aggregates produced by steel companies in Brazil. Used aggregate testing data (leaching, pH, and total content) and aggregate application to evaluate exposure pathways and compare to health-based screening levels established by the USEPA and Brazil.

Developed risk-based target concentrations (RBTCs) in soil vapor for multiple source areas to evaluate the performance and efficacy of soil vapor extraction (SVE). After shut-down of the SVE system, the RBTCs were used to estimate the potential health risks from exposure to post-rebound soil vapor conditions under residential and commercial/industrial land use. The results of the risk evaluations were used to determine acceptable land use and obtain closure under the oversight of the Department of Toxic Substances Control (DTSC).

Prepared a post-remedial human health risk assessment (HHRA) to evaluate potential human health hazards and risks associated with exposure to contaminants in soil and indoor air, following the completion of soil excavation at a current commercial site. The soil excavation activities were designed to remove soils and soil vapor containing petroleum hydrocarbons related to free-phase gasoline, in the vicinity of two former underground storage tanks (USTs). Soil and indoor air data were used to evaluate potential human health risks as a conservative estimate of potential noncancer health effects and theoretical lifetime excess cancer risks for current and future potential receptors. This HHRA was conducted to meet the requirements for site closure under the terms of the State Water Resources Control Board Low-Threat Underground Storage Tank Case Closure Policy.

Estimated volatilization from the subsurface to indoor air using DTSC Human and Ecological Risk Office (HERO) version of the Johnson & Ettinger (J&E) vapor intrusion screening model. The analytical results from collected soil vapor samples from the SVE well and soil vapor probes associated with the SVE system were used in the human health risk evaluation (HHRE) of potential vapor intrusion. Also evaluated the potential impact to groundwater from the leaching of trichloroethene (TCE) and tetrachloroethene (PCE) in the subsurface of the former facility using EPA's VLEACH model. The VLEACH output was compared to California's maximum contaminant levels (MCLs) in groundwater as additional evidence to terminate the SVE operation at the site.

Performed a statistical analysis of metal concentrations in soil samples collected at the site. Proposed background threshold values (BTVs) to identify chemicals of potential concern for the risk assessments. Identified a soil data set for the site using Quantile-Quantile (Q-Q) plots, performed a statistical evaluation of outliers, and estimated BTVs for metals in soil for the best-fit distribution using the 95th upper prediction limit (UPL) for each metal.

Conducted an alternative phthalate analysis for the Dutch National Institute for Public Health and the Environment in the Netherlands (RIVM). Produced a detailed analysis of the alternatives to the phthalates in Annex XIV and on the Candidate List for their six most relevant applications. Identified the current use of phthalates in ceramic sheets and printing pastes for the automotive industry, as well as phthalate use in propellants. The health and environmental impacts of the current phthalate use were then compared to non- (or low-) risk alternatives.

Conducted a comprehensive data gathering of ethylenediamine mammalian toxicity studies published in European REACH, government reports, published journals, and other published databases. Evaluated the toxicity of ethylenediamine mammalian toxicity assessments to derive environmental human health risk limits based on the guidance set forth by the Dutch RIVM.

Provided technical support for the risk-based portion of the closure request under the Low-Threat Closure Policy for leaking underground fuel tanks (LUFTs). Remediation at the site had included free-product pumping and four years of operating an SVE system due to a release of petroleum hydrocarbons from two underground storage tanks (USTs) which formerly contained diesel, gasoline, and paint thinner. Investigation and remediation were complicated by the revelation that continued operation of the SVE and treatment system was likely pulling chlorinated VOCs from off-site sources close to the facility.

Provided toxicological support in a comparative risk assessment that was performed on three commercial flame-retardant materials. Evaluated relative hazards associated with acidic combustion gases to skin during a full-engulfment flash fire event. The tests were performed in accordance with ASTM F1930 and ISO 13506: Standard Test Method for Evaluation of Flame Resistant Clothing for Protection against Fire Simulations Using an Instrumented Manikin. The study was published in the journal *Burns*. Also, provided toxicological support in a comparative risk assessment that was performed on nine commercial flame-retardant materials. Evaluated relative hazards associated with combustion gases during a full-engulfment flash fire event and compared gas exposures

between various materials. The study was conducted in accordance with ASTM F1930 and ISO 13506 and was published in the journal *Fire Technology*.

Gathered information on substances classified as sensitizers for the European Chemicals Agency (ECHA). Identified information sources and databases providing epidemiological information and information on occupational diseases or accidents involving chemical substances classified as sensitizers, which can be used by ECHA for documenting—in qualitative and quantitative terms—the health impacts exerted by those substances. Sourced and reported on epidemiological information, incidences of occupational diseases or accidents attributed to ethylenediamine, to be used as evidence to demonstrate that these substances cause health effects and to indicate the dimension of these effects in qualitative and quantitative terms.

Provided California Environmental Quality Act (CEQA) support for a mine expansion, which included the development of a spreadsheet to allow health risks for multiple expansion scenarios to be calculated quickly and effectively. This streamlined the evaluation of the potential health impacts for a complex variety of fugitive emissions from mobile and stationary sources. Health risks were evaluated for multiple exposure pathways, including inhalation, soil ingestion, dermal exposure, and ingestion of homegrown produce.

As part of a Corrective Action Consent Agreement (CACA) under Cal-EPA Department of Toxic Substances Control (DTSC) oversight at a scrap metal recycling facility, validated soil analytical data in accordance with USEPA National Functional Guidelines and assisted in the statistical evaluation of data generated. Worked closely with the project team to evaluate the significance of the soil analytical results with respect to risk-based criteria for protection of human health from dermal contact and ingestion and underlying groundwater resources. Prepared a draft report of findings and conclusions for submission to DTSC and other stakeholders in support of a risk-based closure plan that included recording of a land-use covenant to restrict residential use, as well as maintenance of the site's concrete cap and implementation of a soil management plan for future site activities.

Regulatory Compliance

Supported a light manufacturer in determining the regulatory compliance status for each of their operating sales offices. Assisted their product stewardship in determining environmental, health, and safety requirements related to import/export of products (including, but not limited to, import of products or components that they receive from suppliers) in countries where its sales offices reside.

Undertook a systematic survey and interpretation of international regulations that address the manufacture, transport, and consumer sales of pressurized aerosol containers.

Summarized the roles and responsibilities of the Environmental Safety Specialist (ESS) at the Coachella Valley Water District (CVWD) to facilitate the transition of a new ESS staff person who would be assuming the role. Documented the ESS's implementation of various functions that included the recycling program, risk management plans/audits, air quality permit inspection, Accidental Release Program (ARP) inspections, hazardous waste handling, and disposal process. Prepared a report summarizing the roles and responsibilities of the ESS, including a spreadsheet of lists and schedules related to audits, inspections, permits, and other facets of the operation.

Product Stewardship

Reviewed the chemical ingredients and concentrations present in a carpet stain remover and wood-floor cleaner and assessed their overall potential effect on human health. Multiple data sources were searched for human health and environmental endpoints by chemical CAS No. The primary data sources used for this evaluation were the U.S. EPA's Hazard Comparison Dashboard (HCD); Toxplanet database; the European Chemicals Agency (ECHA) Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) registered substances database; the U.S. Food & Drug Administration (U.S. FDA) Inactive Ingredient Search for Approved Drug Products (chemical searched by name); the GRAS (Generally Recognized as Safe) Substances (SCOGS [select committee on GRAS substances]) Database (chemical searched by CAS No.); the Food Ingredient and Packaging Inventories

(chemical searched by CAS No. and name); and FDALabel: full-text search of drug product labeling database. For some chemicals, additional literature searching was conducted to identify original studies that could better inform the hazard characterizations.

Identified and summarized publicly available health and hazard data relevant to 13 per- and polyfluoroalkyl substance(s) (PFAS) compounds that had been measured in containers, because there was potential for consumer exposure. Data included physical-chemical properties and high-level toxicity/hazard data gathered from the U.S. EPA's CompTox Dashboard, the U.S. EPA's Hazard Comparison Dashboard (HCD), and the Interstate Technology and Regulatory Council (ITRC). Hazard scores were assigned, and a final qualitative ranking was summarized for each PFAS compound.

Evaluated concentrations of chemical ingredients in lubricant products such as gear oils, greases, and other oils and lubricants, that would require a warning label pursuant to California's Safe Drinking Water and Toxic Enforcement Act of 1986 (commonly referred to as Proposition 65). Developed exposure scenarios relevant to each product group, incorporating chemical-specific dermal absorption factors, potential incidental ingestion, product-specific density, and product-specific exposure frequencies. Using these exposure parameters, estimated potential exposures to the listed chemicals in the product to assess whether Proposition 65 notifications were required.

Managed a product stewardship contract for a global supplier. Estimated daily consumer exposure and doses to evaluate compliance with the State of California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) and Health Canada's, "Quality of Natural Health Products Guide." Responsibilities included evaluating products to demonstrate that they could be marketed in California (without the need of Proposition 65 warnings) and Canada. This involved a wide range of products, including plastic articles, health and personal hygiene products, over-the-counter (OTC) pharmaceuticals, food supplements, and others.

As the result of a corporate directive to eliminate "toxic" materials from the manufacturing process, supported an athletic shoe manufacturer in identifying hazards associated with production chemicals and assisted in finding safer alternatives. Supported the ongoing evaluation of consumer health safety for the sportswear industry by providing chemical hazard rankings.

Provided chemical and toxicological litigation support for two Proposition 65 cases involving lead exposure from vinyl football flags and phthalate exposure from a vinyl exercise mat.

Industrial Hygiene

Conducted a lead exposure assessment of surface dusts containing lead, to characterize workers' potential exposure to lead via incidental ingestion from hand-to-mouth contact. Collected surface samples from building surfaces and garments to evaluate current exposure conditions according to NIOSH Method 9100.

Conducted occupational exposure measurements at a commercial metal-finishing facility that services the aerospace, military, and defense industries. Measured hexavalent chromium among anodizers and spray-painting and surface-preparation personnel, measured cadmium and nickel among the platers, and measured noise among selected personnel. Assisted in updating the client's Injury and Illness Prevention Plan (IIPP) and developing procedures, hazard controls, training content, and compliance plans to help the facility achieve and maintain compliance with applicable Cal/OSHA health and safety regulations.

Conducted a comprehensive industrial hygiene exposure assessment for a commercial railway transportation client. The purpose was to characterize employee exposures to noise and airborne contaminants associated with their various assigned duties. The scope of the assessment included personal noise dosimetry, collection of personal air samples, and observation of personnel work practices, equipment, engineering controls, consumables and personal protective equipment.

On behalf of a large insurance company, provided third-party industrial hygiene services to assess the impact of wildfire-related damage at a residence affected by a nearby wildfire. Conducted site evaluations that included visual assessments and the collection of surface tape-lift samples inside and outside the residence. The tape-lift samples were sent to a fire residue testing laboratory and analyzed for the presence of wildfire combustion particles (soot, char, and ash). The results were compared to other combustion particles and debris to assess the impact of the wildfire on the residence and possible mitigation strategies.

Completed a study that evaluated the relative safety of explosive devices and determined the distribution of toxic materials, as well as their hazards. Participated in the field testing, data analysis, and report writing for the evaluation of particulate emissions generated by the explosive device. Assisted in the development of an occupational exposure model that can be used to determine when exposure exceeds the permissible exposure limit for the toxic material.

Performed data gathering and observation of workers engaged in large valve grinding. Data gathering included such things as measurements of the workstations, measurements of part movements and reaches, measurement and weight of parts and tools, and hand-force and grip-force measurements.

Provided third-party expert industrial hygiene services for a four-million-dollar mold remediation job. Conducted onsite mold and moisture assessments, which included visual assessments, use of a surface and pin moisture meter and infrared thermography camera, and collection of a mold sample for fungal identification at a large hotel in southern California. Provided mold remediation cost projections and reviewed invoices to evaluate appropriate and customary mold remediation costs on behalf of a large insurance company.

Provided oversight and development for client's approaches to hazard communication regarding automobile fluids and batteries. Provided ongoing support as needed in compliance with OSHA Hazcom 2012 (29 CFR 1910.1200).

Converted automotive and transportation battery material data safety sheets (MSDS) to globally harmonized system (GHS) format.

Systematic Literature Reviews

Conducted targeted literature searches in PubMed and Embase. Created search strings and developed exclusion criteria, conducted the literature search, screened title and abstracts for eligibility, screened full text for eligibility, and conducted data abstraction. Following the literature search, the systematic review software programs SWIFT-Review and DistillerSR were used to deduplicate and prioritize the papers using topic modeling.

Graduate Experience

Researched the effectiveness of California's Imperial Visions Action Network (IVAN) (the first community-based environmental enforcement reporting site in the United States). Work included interviews with policymakers, stakeholders, and community members. Compiled results in a formal research paper and presented the study at the University of California, Los Angeles (UCLA) Fielding School of Public Health Graduate Seminar.

Served as a research assistant in the Sustainable Technology and Policy Program at the UCLA School of Law.

Searched and summarized journal articles related to predictive toxicology, risk assessment, and risk management.

Taught two lab sections in the UCLA course, "Molecular Basis of Plant Differentiation and Development." In the UCLA Environmental Science Practicum, taught a pair of lab sections covering research techniques in environmental science, including an introduction to GIS, GPS, and other quantitative techniques.

Undergraduate Experience

In the Biology Department at Loyola Marymount University, studied the use of *Salicornia virginica* plant height as an indicator of sodium content in surrounding soils of a wetland area. Used the Jenway Clinical PFP7 flame photometer to measure soil sodium content. Used *Statistica* version 6 to analyze plant heights.

Working in the Minority Health Disparities Summer Research Opportunity Program at the University of Arizona, Tucson, College of Public Health:

- Analyzed Arizona hospital discharge data to identify pediatric asthmatic patients who visited the hospital in 2004 based on zip code
- Produced diesel exposure maps of Pima County, Arizona, using ESRI GIS ArcView
- Spatially compared diesel exposure to pediatric asthma prevalence based on family income and race.

MANUSCRIPTS

Mackay CE, **Vivanco SN**, Yeboah G, Vercellone J. 2016. Assessment of dermal hazard from acid burns with fire retardant garments in a full-size simulation of an engulfment flash fire. *Burns* 42(6):1350–1356.

Mackay CE, **Vivanco SN**, Reinhardt TE, McClure S, Vercellone J. 2015. Real-time monitoring and assessment of thermal and toxicological risk associated with fire retardant textiles in a full-size simulation of an engulfment flash fire. *Fire Technol* 51(5):1167–1193.

Bogeberg M, **Vivanco S**, Carmona-Galindo V. 2011. Relationship between soil sodium concentration and plant height in *Salicornia virginica* in the Ballona Wetlands in Los Angeles, CA. *BIOS* 82(4):112–116.

ABSTRACTS AND PRESENTATIONS

Vivanco SN, Chowdhary P, Kelly C. Evaluating Prop65 exposure to ethylene oxide and 1,4-dioxane in personal care products. Presentation to Society of Environmental Toxicology and Chemistry, November 2018.

Chowdhary P, **Vivanco SN**, Kelly C, Leiga A. What's in your laundry detergent? An evaluation of common surfactants found in laundry detergents and their PBT characteristics. Presentation to Society of Environmental Toxicology and Chemistry, November 2018.

Vivanco S. Protecting the movie industry from lead generated by pyrotechnic effects. Presentation to AMEC Technical Summit, 2014.

Gneiding L, Kelly C, Winters B, **Vivanco S**. Evaluation of selected substances in consumer products for PBT characteristics. Presentation to Society of Environmental Toxicology and Chemistry, November 2012.

Vivanco S. IVAN's effectiveness in identifying and addressing environmental harms in underserved communities. University of California, Los Angeles Fielding School of Public Health Graduate Seminar, Los Angeles, CA, fall 2011.

Vivanco S. Spatial relationship between pediatric asthma, asthma risk factors and diesel pollutants. Presentation to Annual Biomedical Research Conference for Minority Students, Phoenix, AZ, 2009.