



ANITA B. BROUGHTON, CIH, EIT

Chief Scientist | Principal

EDUCATION

M.S., Civil Engineering, Environmental Health Focus, Tufts University, 1987 (graduate studies)

B.S., Environmental Resource Management, Specializing in Hydrology, Pennsylvania State University, 1982

PROFESSIONAL REGISTRATIONS

Engineer-In-Training (EIT)

Certified Industrial Hygienist (CIH) (No. 5682)

SPECIAL STUDIES AND COURSES

OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Trainer (29 CFR 1910.120)

Lead Inspectors/Assessors, Project Designer, and Project Monitor Courses

Spill Prevention and Countermeasures Plan (SPCC) Preparation Training Class, presented by U.S. Environmental Protection Agency (EPA)

Facility Response Plan (FRP) Preparation Training Class, presented by EPA

Ms. Broughton has over 30 years of environmental consulting experience. She has managed hundreds of regulatory compliance projects, facility audits, human health and ecological risk assessments, environmental site assessments, investigations, and remediation projects specializing on fast-track redevelopment projects. She has been conducting multi-media human health risk assessments since the original Environmental Protection Agency (EPA) Superfund guidance document was published in 1986. She has conducted risk assessments for residential and commercial redevelopment projects on former industrial facilities and agricultural properties in numerous states including Arizona, California, Connecticut, Delaware, Hawaii, Illinois, Montana, New Hampshire, New Jersey, New York, and Pennsylvania, the District of Columbia, and Guam.

She is a member of the American Industrial Hygiene Association (AIHA) Risk Assessment Committee, and was a member of the national Interstate Technology Regulatory Council (ITRC) vapor intrusion team from 2004 through 2011 and the County of San Diego Site Assessment and Mitigation Steering Committee from 1998 through 2008. In 2007 and 2008 she was an ITRC trainer for multiple vapor intrusion webinar courses, and was an instructor and proctor for the ITRC vapor intrusion classroom training program from 2008 through 2011. In addition, since 1990 she has participated on various California state and local regulatory committees involved in preparing guidance for vapor intrusion evaluation, burn ash classification, risk assessment, chemical fate and transport, field quality assurance/quality control, soil reuse/waste discharge requirements, corrective action plans, and voluntary assistance program/site redevelopment.

Ms. Broughton has been designated as an expert witness on due diligence, contaminated sites, and health and safety matters. She has also been a guest lecturer for industrial hygiene courses at the University of California, San Diego, and has provided Occupational Safety and Health Administration (OSHA) safety and health training for the U.S. Navy and manufacturing clients.

RELEVANT PROJECT EXPERIENCE

D.C. United Soccer Stadium Site Redevelopment, Washington, D.C. Principal risk assessor for the assessment of potential health risk associated with the remediation and development of the former industrial property planned to be developed with a soccer stadium. Remediation is planned to protect public health, including both potential on-site and off-site receptor, and water quality. A community health and safety plan was also prepared and being implemented to address community concerns regarding the potential inhalation of particulates generated from on-site remediation and construction activities.

Former Xerox Facility, Commercial and Residential Development, Pomona, CA. Principal risk assessor assisting with the evaluation of various redevelopment alternatives, including commercial and residential land uses. Derived risk-based remediation criteria and assisted with the development of various mitigation strategies to protect public health and groundwater quality, to expedite redevelopment opportunities, and to limit future client (former site occupant) liability. Remedial measures included soil excavation and soil vapor extraction to remedy potential vapor intrusion risks such that the site can be developed for residential purposes. Chemicals of concern were primarily volatile organic hydrocarbons (VOCs), metals, and polychlorinated biphenyls (PCBs). Onsite soil and groundwater remediation activities have been completed, and closure has been obtained by the Los Angeles Regional Water Quality Control Board (LARWQCB).

Aircraft Manufacturing Site Redevelopment Projects, Southern California. Principal risk assessor for investigation planning documents, sampling and analysis plans, waste management plans, H&S plans, and investigation and feasibility studies for former aerospace manufacturing facilities occupied by McDonnell Douglas, Rockeydyne, Voght, UTC, Goodrich Aerostructures, UTC, and General Dynamics. Conducted pre- and post-remediation human health risk assessments, developed site-specific remediation criteria for the protection of human health and groundwater, and assisted with remediation/mitigation strategy development. The chemicals of potential concern included a wide range of chemical types, consistent with typical former aerospace manufacturing facility operations. Risk assessments included evaluating various commercial, industrial, and residential land uses. Vapor intrusion pathway evaluation included quantifying risk associated with inhalation of subsurface vapors into slab-on-grade buildings and subsurface parking structures. Risk assessments were updated real-time during remediation activities to assess what additional remediation may be warranted, if any, when newly discovered impact areas were identified during site demolition and grading activities. The Department of Toxic Substances Control (DTSC), Office of Environmental Health Hazard Assessment (OEHHA), Regional Water Quality Control Boards (RWQCBs) provided regulatory oversight.

Former Battery Manufacturing Facility, Delphi, Vapor Intrusion Evaluation and Multi-pathway Risk Assessment, Anaheim, CA Principal risk assessor and Certified Industrial Hygienist for investigation and remediation activities of a former facility property undergoing corrective action for which the DTSC was the lead regulatory agency. The primary chemicals of concern were metals, PCBs, and VOCs. In addition to conducting a risk assessment to assess whether remediation was warranted for the anticipated on-site commercial/ industrial redevelopment, including the evaluation of potential vapor intrusion concerns for future site occupants. Ms. Broughton also assisted with preparing the remedial investigation work plan and site closure report, derived remediation criteria, and developed an air monitoring and mitigation plan that was implemented during site investigation and remediation activities to protect workers and potential offsite receptors, including children playing at an adjacent ballfield. Site closure was obtained from DTSC.

Bronson Superfund Site, Bronson, MI. Principal risk assessor for three parcels comprising the Scott Fetzer Facility of the North Bronson Former Facilities Site. The site is situated adjacent to residential and commercial properties. Historical onsite operations included mold machining as well as tin and zinc plating operations, and associated water treatment and discharge activities. Evaluated human receptors included current onsite trespassers; current and future onsite utility workers; future onsite construction workers, landscapers; residents, commercial workers, and recreators; existing and future offsite residents, and existing and future offsite commercial workers. The risk assessment was used to identify whether remediation was warranted, and was used in the feasibility study, both of which were approved by EPA

Aircraft Manufacturer, Riverside, CA. Responsible for managing and conducting a vapor intrusion evaluation for numerous offsite residences downgradient of a groundwater plume originating from the aerospace manufacturer's facility. The constituents of concern were chlorinated solvents. The evaluation included a soil gas survey to obtain soil gas concentrations downgradient of the plume and in proximity to the offsite residential structures. Samples were collected on the facility property, public rights-of-way, and on residential properties. Soil samples were also collected to obtain physical parameter information and limited groundwater sampling was conducted to supplement previously collected data in proximity to the offsite properties. The vapor risk evaluation included a point-by-point risk evaluation using the Johnson & Ettinger vapor intrusion model to estimate potential indoor air concentrations and the subsequent estimation of potential health risks to offsite residents under a 30-year residential scenario. The risk

gradients were used to assess whether offsite chemical migration may pose an unacceptable risk to the existing offsite residents, and to estimate the potential extent of the area that exceeds acceptable risk thresholds and thus may require further assessment or remediation.

Former Goodrich Aerostructures Facility, Chula Vista, CA. Principal risk assessor in preparing baseline and post-remediation human health risk assessments for a former aerospace manufacturing facility. The former facility property is a part of a relatively large redevelopment area, and is owned by the Port of San Diego. The risk assessment was prepared to address various stakeholder concerns. The stakeholders include, among others, Goodrich Aerostructures, Port of San Diego, City of Chula Vista, the California Department of Toxic Substances Control, California Regional Water Quality Control Board, U.S. Fish and Wildlife, California Department of Fish and Game, National Oceanographic and Atmospheric Association, Environmental Health Coalition, and Surfrider Foundation. Primary chemicals of concern are chlorinated hydrocarbons and polynuclear biphenyls. The redevelopment project includes a variety of proposed uses including commercial, recreational, and residential structures. Site mitigation and remediation goals were derived to be protective of adjacent residences, primarily from inhalation of fugitive dust generated from impacted soil.

Former Teledyne Ryan Aeronautical Facility, Vapor Intrusion, Industrial Hygiene, and Third-Party Oversight Strategy Development, San Diego, CA. Officer-in-charge, technical reviewer, and principal risk assessor for various projects related to airport redevelopment and industrial hygiene activities, including the assessment of potential vapor intrusion concerns. Some of these projects included third party oversight of investigation activities and litigation support strategies, assessment of potential health risk associated with various redevelopment and property reuse alternatives, development and implementation of a community health and safety plan during redevelopment construction activities, and review of indoor air sampling results for building re-occupancy.

New Marsh Aviation Site, Goodyear, AZ. Principal risk assessor for a property containing a former facility that conducted aerial application of organochlorine pesticides and arsenic-based defoliant on nearby farms. Proposed development of the site includes both residential and mixed commercial uses. A baseline risk evaluation was conducted using Arizona Department of Environmental Quality (ADEQ)-derived soil remediation levels. Based on this evaluation, remedial soil excavation was conducted. Confirmation samples and other in-situ samples were used to conduct a post-remediation risk evaluation to verify remediation completion. The project was approved by the ADEQ.

Former Xerox Facility, Irvine, CA. Principal risk assessor for the evaluation of baseline and post-remediation health risks, including vapor intrusion evaluations, conducted under DTSC oversight. Results of the baseline vapor intrusion evaluation indicated that remediation was not warranted for this pathway. However, since post remediation backfill placement changed the soil conditions at the site, a post-remediation soil gas survey and vapor intrusion evaluation was conducted to ensure that the post-remediation conditions did not warrant mitigation to address potential vapor intrusion concerns.

Colton Joint Unified School District, School Development, Grand Terrace and Colton, CA. Managed and provided technical support, including conducting vapor intrusion evaluations, for several high school sites and projects, under DTSCw oversight. These projects include completion of Phase I and Preliminary Environmental Assessment reports, a Phase I addendum, and a supplemental site investigation. The New High School No. 3 site is approximately 65-acres and contained several properties of various land uses including lumber yards, automotive repair, and agricultural. A portion of this property was a portion of a former RCRA site and within the RCRA corrective action program. Two groups within the DTSC, the DTSC School Property Evaluation and Cleanup Division and the DTSC Hazardous Waste Management Program, Permitting Unit, provided oversight and granted site closure. Detected onsite chemicals included pesticides, petroleum-based and chlorinated hydrocarbons, and metals. This high school site was the first one in California that was issued a no further action with a deed restriction regarding the mitigation of potential vapor intrusion concerns.

Active Manufacturing Facility, Existing and Future Use Vapor Intrusion Evaluations, Woodland Hills, CA. Technical lead and principal risk assessor for investigation and remediation activities at an active manufacturing facility. The

primary exposure pathway of concern is vapor intrusion into existing and potential future commercial/industrial buildings at the site. The LARWQCB is the oversight agency, with technical input from OEHHA. The vapor intrusion evaluation is being conducted using a multiple lines of evidence approach, considering data from multiple media (groundwater, soil, soil gas, slab, and indoor and ambient air samples). For the existing buildings evaluation, other building-specific characteristics were also considered in the evaluation, such as air handling areas and calculated air exchange rates. Indoor air samples have also been collected during two separate sampling events.

Former Teledyne Ryan Aeronautical Facility, San Diego, CA. Expert witness and project manager for a comprehensive baseline site-wide investigation and remediation alternative evaluation of a 44-acre former aerospace manufacturing facility. The project was completed in an expedited timeline to support 3 separate law suits which were pending regarding the site. Responsible for addressing historical on-site and off-site issues, litigation support, expert witness testimony regarding human health risk assessment, groundwater protection, and derivation of remedial goals, and data interpretation using GIS and visualization software. The field effort included the collection of over 400 soil gas samples, 1,100 soil samples, 200 groundwater samples, 100 surface material samples, and closure of three underground storage tanks (USTs) within a 3-month time period. Investigation activities also included an evaluation of possible (PCB)-containing surface materials and discharge of these materials to the on-site storm water conveyance system that impacted San Diego Bay.

New Hampshire Superfund Site. Task manager for preparing the human health risk assessment as part of the remedial investigation and to support the remedial feasibility study for a property contaminated by chlorinated solvents. The groundwater contaminant plume migrated 1 mile off-site.

Former Health-Tex Facility, Cowpens, SC. Provided technical input for the evaluation of indoor air versus subsurface sources of VOC detected in indoor air of several structures.

Ashland Oil Company, Inc., Pennsylvania. Developed the project QA/QC plan for the initial impact analysis for a subsequent natural resource damages assessment of a large oil spill that discharged into the Ohio River System. The human health risk assessment focused primarily on potential exposure associated with the ingestion of fish caught from the river.

PRESENTATIONS AND ARTICLES

“Environmental Characterization to Estimate Potential Health Risks”, presented at the 2012 California Industrial Hygiene Council (CIHC) Conference Exploring New Horizons, San Diego, CA, December 2012.

Classroom instructor of the 2-day class entitled “ITRC Vapor Intrusion Pathway: A Practical Guide,” with W. Morris, J. Boyer, T. McAlary, D. Folkes, and B. Hartman, Interstate Technology & Regulatory Council, October 2010, Atlanta, GA January 2011, San Antonio, TX; July 2011, Detroit, MI.

“Vapor Intrusion: Volatile Chemicals and Methane,” with J. Squire, presented at the Indoor Air Quality Association Conference, Los Angeles, CA, February 2009.

Webinar instructor of the “Framework of Vapor Intrusion Pathway Evaluations” portion of class entitled “ITRC Vapor Intrusion Pathway: A Practical Guide”, Interstate Technology & Regulatory Council, May and September 2007, February and July 2008.

“EPA's Rule Changes will Impact Land Transactions” article published in the California Real Estate Journal, April 2006 (with L. Turturro and P. Galoski).

“All Appropriate Inquiry The New Standard for Phase I Environmental Site Assessments”, Los Angeles County Bar Association, Los Angeles, CA, January 2006.

University of California, San Diego, Extension Program guest lecturer, Principals of Industrial Hygiene. 1997-1998.

