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Professional Profile

Dr. Benton is a geochemist with over 20 years of experience in environmental forensic questions related to legal claims. Much of her work involves chemical fingerprinting, historical reconstruction of chemical releases, and data optimization.

Dr. Benton's work with industrial and legal clients has involved the environmental chemistry of metals and metalloids, dioxins and furans, PAHs, VOCs, and MTBE for environmental studies related to mining and smelting sites, oil spills, landfills, wood treatment facilities, and former manufactured gas plants. Frequently, these analyses have been used to evaluate cost allocation, insurance coverage, property damage, and personal injury claims.

Academic Credentials & Professional Honors

Ph.D., Geosciences, University of Tulsa, 1997

M.S., Geochemistry, New Mexico Inst. of Mining and Technology, 1991

A.B., Earth Sciences, Dartmouth College, 1987

Phi Beta Kappa, 1997

Licenses and Certifications

Licensed Geologist (WA)

Prior Experience

National Science Foundation Post-Doctoral Fellow, Department of Terrestrial Magnetism, Carnegie Institution of Washington, 1998-2000

Geochemist, Gardere & Wynne, 1997-1998

Graduate Research Assistant, Los Alamos National Laboratory, Summer 1994

Scientist I & II, Geraghty & Miller, 1989, 1991-1992

Professional Affiliations

American Association for the Advancement of Science

Publications

Benton L, Shields WJ, Edwards M. Commentary on O'Connor and Sabrsula (2005): Background dioxins in house dusts (Environmental Forensics 6(3):238-287). Environmental Forensics 2007; 8:295-298.

Shields WJ, Tondeur Y, Benton L, Edwards MR. Dioxins and Furans. In: Environmental Forensics: Contaminant Specific Guide Chapter 14. Morrison R and Murphy B (eds), Academic Press, New York, 576 pp., 2005.

Benton LD, Ryan JG, Savov LP. Lithium abundance and isotope systematics of forearc serpentinites, Conical Seamount, Mariana forearc: Insights into the mechanics of slab-mantle exchange during subduction. Geochem. Geophys. Geosys. 5, Q08J12, doi:10.1029/2004GC000708, 2004.

Williams P, Benton L, Sheehan P. The risk of MTBE relative to other VOCs in public drinking water in California. Risk Analysis 2004; 24(3):621-634.

Williams P, Benton L, Sheehan P. MTBE in California's drinking water: A comparison of groundwater versus surface water sources. Env Forens 2003; 4(3):175-189.

Tomascak PB, Widom E, Benton LD, Goldstein SL, Ryan JG. The control of lithium budgets in island arcs, Earth Planet. Sci. Lett 2002; 196:227-238.

Williams P, Benton LJ, Warmerdam J, Sheehan P. Comparative risk analysis of six volatile organic compounds in California drinking water. Environ. Sci. Technol 2002; 36(22):4721-4728.

Benton LD, Ryan JG, Tera F. Boron isotope systematics of slab fluids as inferred from a serpentine seamount, Mariana forearc. Earth Planet. Sci. Lett 2001; 187:273-282.

Norman DI, Benton LD, Albinson T. Calculation of $f(O2)$ and $f(S2)$ of ore fluids, and pressure of mineralization from fluid inclusion gas analysis for the Fresnillo, Colorada, and Sombrerete Pb-Zn-Ag deposits, Mexico. In: Source, Transport and Deposition of Metals. Pagel, M., Leroy, J.L. (eds), Rotterdam, A.A. Balkema, p. 209-212, 1991.

Abstracts and Presentations

Benton L, Shields WJ, Edwards, M. What's in the dust? The answer is in the details. Air & Waste Management Association, PNWIS 2006: Healthy Communities Using Science-Based Solutions for Sustainability, Victoria, BC, November 8-10, 2006.

Benton LD, Ginevan ME, Edwards MR. Chemical fingerprinting of dioxins using a similarity index. AEHS 16th Annual Meeting and West Cost Conference on Soils, Sediments and Water, San Diego, CA, March 13-16, 2006.

Benton LD, Edwards MR. Source identification of dioxin near wood treatment plants. Air & Waste Management Association, PNWIS 2005: International Perspectives on Environmental Management, Blaine, WA, November 8-11, 2005.

Ginevan M, Edwards M, Benton L. Statistical tools for the analysis of PCB and dioxin profile data. Platform presentation at the SETAC 26th Annual Meeting in North America, Baltimore, MD, 2005.

Ryan JG, Savov IP, Benton LD. B, Li, and Be insights into forearcs, arcs and beyond. Eos, Trans. AGU 83, Spring Meeting Supplement, Abstract V51D-06, 2002.

Benton LD, Tera F. Lithium isotope systematics of the Marianas revisited. Goldschmidt 2000, Journal of Conference Abstracts 2000; 5(2):210.

Benton LD, Savov I, Ryan JG. Recycling of subducted lithium in forearcs: Insights from a serpentine seamount. Eos, Trans. AGU 80, Spring Meeting Supplement, Abstract V21B-07, 1999.

Benton LD, Tomascak PB, Helz RT. A study of boron isotopes in Kilauea Iki lava lake, Hawaii. Eos, Trans. AGU 80, Fall Meeting Supplement, Abstract V52B-06, 1999.

Benton LB, Haggerty JA, Ryan JG. Boron and lithium geochemistry of unconsolidated serpentines from the Mariana and Izu-Bonin Forearcs: Implications for the origin and evolution of serpentine seamount fluids. Eos, Trans. AGU 76, Fall Meeting Supplement, Abstract V51B-11, 1995.

Benton LD, Turin HJ, Wilcox BP, Gotti NL. In-situ field measurements of saturated and unsaturated conductivity; studies of soil and volcanic tuff. GSA Annual Meeting, Abstracts with Programs 26, 1994.

Project Experience

Metals and Metalloids

Served as project manager in a study of the divisibility of harm arising from metal and metalloid contamination at the Upper Columbia River site. Evaluated contribution of metals from mining, smelting, and baseline sources to the Upper Columbia River. Assessed the role of background soils, landslides, and wastewater treatment plants in addition to other sources.

Served as project manager for the evaluation of historic contributions of lead and other metals to residential soil cleanup areas for a site near Buffalo, New York. Sources evaluated included a former high-lead brass foundry, lead smelter, railroad repair and fabrication facility, steel forge, iron foundry, and storage battery manufacturing plant. Used metals ratios, spatial distribution, waste generation analysis, lead mineralogy, and lead isotope chemistry to evaluate source contributions.

Evaluated the source of arsenic and lead in soils and sediment for litigation regarding a normal superphosphate plant in Charleston, South Carolina. The source of sulfuric acid used in fertilizer production was sulfur from burning pyrite and later elemental sulfur. Lead from the lead-lined chambers used in sulfuric acid production was also investigated. Contributions of lead and arsenic were allocated to various owners over time using the years of operation, changes in capacity, and other records.

Served as project manager for a source allocation study of lead in residential yards at the Tar Creek Superfund site. Reconstructed historical deposition of lead from fugitive dust from chat piles and tailings ponds by modeling emission, dispersion, and deposition of lead-containing particles over 80 or more years. Calibrated model with site-specific soil transect data.

Served as project manager for an evaluation of the fate and transport of thallium in dust from a landfill at a military base in southern California. Key analyses included worst-case-scenario modeling of thallium concentrations in air and soil using a detailed history of excavation and landfill activities and soil data from multiple sources.

Reconstructed the history of releases and aerial deposition of lead from stack and building emissions, and fugitive dust from a secondary lead smelter in Seattle. Modeling was used to estimate soil lead concentrations attributable to the smelter. Key research identified process upsets that had been documented but not compiled during routine ambient monitoring by state and local air agencies.

Evaluated source and timing of slag use at a former zinc smelter site near East St. Louis, IL.

Prepared quality assurance project plans (QAPPs) including one for non-traditional environmental laboratories conducting specialized metals and isotopic analyses.

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans (PCDD/Fs)

Served as project manager for an evaluation of potential sources of dioxins and furans in the vicinity of a former 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) manufacturing facility in West Virginia. Work included researching potential sources, the geospatial variability of soil and house dust data, and the congener patterns in serum data.

Evaluated potential sources of dioxins and furans for a toxic tort claim regarding a wood treatment plant in Mississippi. Evaluation compared offsite residential soil and house dust to onsite soils and stack emissions using multiple techniques, including congener profile comparisons, principal component analyses, regression analyses, and comparison of selected ion current profiles.

Served as project manager for an evaluation of potential sources of dioxins and furans near a former organic chemical manufacturing site in West Virginia. Evaluation also included analysis of the area-wide variability of dioxin and furan concentrations in residential soil and house dust.

Served as project manager for an evaluation of PCDD/F sources, transport, and fate at the St. Regis superfund site in Cass Lake, Minnesota.

Fate and Transport

Served as project manager for an evaluation of the transport and fate of sulfometuron methyl in south-central Idaho. Assessed the transport and fate of herbicide-laden dust eroded by wind from burned rangeland and transported downwind and deposited on irrigated croplands. Evaluated herbicide degradation rate and leaching potential in both rangeland and irrigated crop lands.

Evaluated spilled oil and produced water related to oil exploration and production in the Sacha field in the Amazon basin region of Ecuador for a toxic tort claim involving ChevronTexaco. Analysis included timing of release, transport pathways, and environmental fate.

Evaluated a groundwater treatment system storage and distribution terminal in Michigan. Analysis assessed the timing and volume of releases at the site for allocation and apportionment of contamination and remediation costs.

Participated in the assessment of waters infiltrating into and draining out of underground mine workings for a mining company in Idaho. At the site, contaminated mine drainage was mixing with fresh waters downstream, thereby increasing the volume of water reaching the treatment facility. Analysis traced flow through underground workings to discharges above ground, enabling testifying expert to calculate volumes of actual mine discharge vs. the volume of water being treated.

Assessed offsite operations and potential contaminant releases to groundwater near the site of a former manufactured gas plant (MGP), coal-fired power plant, iron foundry, wood treatment facility, and railroad terminal in downtown Seattle. Results used to evaluate the source of PAHs and appropriateness of remedial action at the site.

Prepared detailed histories of industrial sites in Lake Charles, Louisiana. Research consisted of developing profiles of individual sites, including inputs, processes, and outputs, with additional scrutiny on possible discharges to water. Evaluation also included analysis of possible undocumented contaminant outputs based on process chemistry.

Assessed MTBE and other chemicals in groundwater and surface water in California. Analysis to determine the detection frequency and concentrations of contaminants used the California Water Quality

Database to evaluate the potential risk to public health.

Served as team leader and geologist on field efforts involving groundwater and soil sampling and installation of monitoring and pumping wells at gas stations and industrial facilities in Alabama, Tennessee, and Washington.

Spatial and Data Analysis

Served as project manager in developing a computer-based tool for viewing user-defined site data. Tool was designed to accommodate research needs of attorneys preparing for litigation by integrating sample data, maps, photographs, and relevant documents for interactive viewing.

Evaluated PAH transport and fate in a river draining into Boston Harbor, Massachusetts. The timing of contamination was constrained by reconstructing the dredging and filling history of the river using bathymetric surveys, dredging permits, and sampling reports.

Conducted a spatial analysis of polychlorinated biphenyl (PCB)-contaminated sediment in a stream system as part of a property damage litigation project related to a facility that manufactured transformers in Georgia. The analysis used tax records, existing reports, and geographic information systems (GIS) to evaluate the appropriateness of previous sampling events.

Evaluated the occurrence of arsenic, cadmium, lead, and zinc in soils near a former zinc smelter in West Virginia. Variations in soil metals concentrations were evaluated at scales ranging from regional to individual residences from which potential sources were considered.

Designed and prepared a tool to perform risk ranking analysis in preparation for REACH for a major home products company. Analysis included the evaluation of product, formula, and raw material information in addition to manufacturing suppliers.