

TECHNICAL SPECIALTIES

Dr. Dorrance's expertise is in reconstructing historical deposition in variety of complex sedimentary environments. Her training and experience in geochemical analysis and environmental forensic techniques has been applied to sites with sediment, soil, groundwater and surface water contamination. She primarily works with clients involved in environmental litigation, but also supports environmental site investigations and remediation. This experience has included numerous large complex CERCLA sites and smaller properties impacted chlorinated solvents, petroleum hydrocarbons, metals and PCBs.

EXPERIENCE SUMMARY

10+ years of experience in environmental sampling, analysis, and use of forensic signatures to determine source and timing of contamination, and contaminant assessment and remediation.

- Senior Scientist, Roux Associates, 2015-present
- Geochemist, Dudek, 2010-2015
- Graduate Student Researcher, University of California San Diego, 2004-2010
- Laboratory Research Assistant, Columbia University, 2001-2003

CREDENTIALS

Ph.D. Oceanography, Scripps Institution of Oceanography, University of California San Diego, La Jolla, California, 2010

M.S. Oceanography, Scripps Institution of Oceanography, University of California San Diego, La Jolla, California, 2010

B.A. Environmental Chemistry, Columbia College, Columbia University, New York, New York, 2004

PROFESSIONAL AFFILIATIONS

American Chemical Society (ACS), Member # 30262991
Association of Women in Water, Energy and Environment

PUBLICATIONS

Roach, L.D., C.D. Charles, D.B. Field, T.P. Guilderson. (2013) Foraminiferal radiocarbon record of northeast Pacific decadal subsurface variability. *Journal of Geophysical Research-Oceans* 118(9): 4317-4333.

Roach, L.R., S. Kellogg, A.H. Love. (2017) What you should know about per- and polyfluoroalkyl substances (PFAS) for environmental claims. *Environmental Claims Journal* 29(4): 290-304.

Baumann, J., D.H. Oliver, L.R. Dorrance, A.H. Love (2018) Approaches to reduce conflict when insuring the environmental cleanup of closed military bases intended for redevelopment. *Environmental Claims Journal* 30(2): 188-199.

KEY PROJECTS

Environmental Forensics

- *Assessment of Alleged Impacts to Groundwater from Oil and Gas Production, California.* Assessed geochemical tracers, including major ion chemistry, stable isotopes and halogen ratios, to evaluate whether saline produced water from oil and gas activity had comeingled with a groundwater aquifer.
- *Chemtronics Superfund Site, North Carolina.* Compiled database of manufactured chemicals, manufacturing processes and associated waste products at former industrial facility that produced explosives, fire retardants, chemical weapons, and other materials. Created geochemical model to assess chemical conditions within waste areas associated with wastes from explosive manufacturing.
- *Diamond Alkali Superfund Site, New Jersey.* Evaluated chemical speciation and fate and transport of contaminants in estuarine surface water and sediment. Synthesized information from numerous historical documents to build multiple lines of evidence supporting project conclusions.
- *Lower Duwamish Waterway Superfund Site, Washington.* Investigated sources of polycyclic aromatic hydrocarbons (PAHs) to estuarine sediments and evaluated statistical and chemical fingerprinting methods of PAH source differentiation. Assessed river-wide sediment data in support of allocation position.
- *Omega Superfund Site, California.* Determined distribution of chlorinated solvents in various matrices at a named CERCLA site. Carried out file reviews and investigated past operational activities at over 30 locations in the vicinity of a co-mingled chlorinated solvent plume.
- *Orange County Water District v. Sabic Innovative Plastics U.S. LLC, et al.* Evaluated migration pathways and potential sources of organic and inorganic contaminants associated with comeingled groundwater plumes. Managed and visualized large datasets containing water quality, lithologic, and well construction information. Provided technical support with preparation of testimony for multiple expert witnesses.
- *Water Resources Investigation, San Diego County, California.* Compiled and evaluated organic, inorganic and isotopic water quality data from groundwater and surface water within two major watersheds. Performed field activities to obtain additional water quality data from surface water samples. Applied geochemical techniques, including stable isotope analysis, to investigate ancient and current sources of surface water and groundwater.

- *Sediment Geochemistry Investigation, Yosemite National Park, California.* Employed a novel isotopic tracer to reconstruct decadal scale hydrologic variability. Analyzed sediment, water and vegetation samples for organic biomarkers and compound specific stable isotope ratios. Evaluated resultant data to assess relationship of stable hydrogen isotope ratios to fluctuations in local and regional hydrologic patterns. Based on this relationship, reconstructed hydrologic variability in the Sierra Nevada Mountains during the past millennium.
- *Marine Research Expedition and Sediment Geochemistry Investigation, Santa Barbara Basin, California.* Measured carbon-14 isotope (radiocarbon) activity in sea water and sediment samples at a national laboratory. Results of isotopic analyses elucidated aspects of decadal scale variability in circulation along the northeast Pacific margin over the past 300 years.

Site Investigations and Cleanup

- *Residential Assessment of Lead Contamination, Los Angeles County, California.* Created and managed database of lead sampling results (paint and soil) from hundreds of residential properties potentially impacted by lead deposition from former stack emissions of former battery recycling facility. Prepared individual reports for each property summarizing sampling results.
- *Former Military Facility, California.* Evaluated environmental claims cleanup actions and costs related to site investigation and remediation.
- *Former Military Facility, California.* Characterized extent of VOC contamination, determined conceptual site model and determined closure eligibility at site surrounded by additional sites under mandatory cleanup orders.
- *Environmental Investigation, Placentia, California.* Collected confirmation soil samples and performed data evaluation to demonstrate success of remedial operations in treating contamination from chlorinated solvents. Prepared Confirmation Soil Sampling Report, which led to site closure from lead regulatory agency.
- *Landfill Investigation, BKK Class I and III Landfills, West Covina, California.* Researched environmental fate of chlorinated compounds in anaerobic environment, compiled chemical and generator data from multiple databases. Prepared diagrams depicting distribution of hazardous waste within the landfill and assisted in developing cost allocation model for PRPs.
- *Groundwater Monitoring and Remediation Project, SPX Corporation, Stockton, California.* Investigated sources and fate of hexavalent chromium in recalcitrant groundwater plume through geochemical data analysis. Reviewed laboratory QA/QC data and

critically evaluated analytical technique used to measure concentrations of trace metals in groundwater.

- *Groundwater Monitoring, Various Sites, Southern California and Nevada.* Performed groundwater monitoring at petroleum hydrocarbon and chlorinated solvent sites in southern California and Nevada. Prepared groundwater monitoring reports and evaluated groundwater flow and contaminant fate and transport.
- *Mixed Industrial Region, Indiana.* Evaluated historical operations, soil lead and arsenic data and chemical signatures of manufacturing processes in soils within and adjacent to historical manufacturing operations.
- *Battery Recycling Facility, California.* Compiled and evaluated extensive soil lead and other heavy metals database for soils surrounding the Exide Technologies lead battery recycling facility.
- *PCB Investigation, Ventura County, California.* In accordance with TSCA, characterized distribution of and evaluated cleanup protocols for polychlorinated biphenyls (PCBs) at a former petroleum refinery and chemical plant.
- *Time Critical Hazardous Waste Removal, Fullerton, California.* Coordinated waste removal procedures for at former metal plating shop. Characterized and profiled waste for proper disposal under local, state and federal regulations. Facilitated rapid removal of thousands of gallons of liquid and solid hazardous waste from the site to disposal facilities.

Water Quality Management

- *Water Quality Services, City of San Diego, California.* Evaluated sampling and analysis protocols designed to ensure water quality regulatory compliance during storm water channel maintenance. Provided technical expertise regarding nutrient cycling and pollutant fate and transport in a wetland-like environment. Planned and executed water quality and sediment sample collection at two storm water channel locations. Prepared Initial Water Quality Assessment required before selected storm channels could undergo routine maintenance to maintain hydraulic capacity.
- *Groundwater Well Investigation, Santa Ynez, California.* Prepared sampling protocol to assess presence of chromium species in well water. Researched potential sources of naturally occurring chromium species. Peer-reviewed geochemical data from well head and depth-discrete water quality sampling. Prepared figures displaying physical, lithological and chemical data from individual wells.