

Richard A. Vogl, PG, CHG, CEG
Principal Hydrogeologist

Mr. Vogl currently serves as a Principal Hydrogeologist at Waterstone Environmental, Inc. Mr. Vogl is a registered professional Geologist, Certified Hydrogeologist, and Certified Engineering Geologist in the state of California and a registered professional Geologist in Oregon. His credentials, along with his over 35 years of professional experience, have led to work on numerous projects involving litigation support and expert witness testimony. Mr. Vogl is an expert in the areas of hydrogeology; soil and groundwater contamination, investigation, and remediation; and soil vapor intrusion. Mr. Vogl has worked on dozens of litigation support projects that have included preparing expert opinion reports and testimony.

Mr. Vogl has performed numerous groundwater monitoring and extraction projects, geologic mapping, Phase I and Phase II environmental assessments, and remedial actions involving soil and groundwater contamination. His strong technical background in environmental assessments and remediation has provided the necessary background information to manage a wide variety of environmental projects.

Mr. Vogl has completed hundreds of Phase I and Phase II environmental site assessments in California for a wide variety of industrial sites and contaminants, including work on dozens of soil and groundwater assessment and remediation projects involving chlorinated hydrocarbon contamination, heavy metals, and other recalcitrant compounds. Remediation techniques employed have included classical solutions such as soil vapor extraction, dual-phase extraction, multi-phase extraction, and groundwater pump and treat as well as other more innovative approaches such as ozone injection and enhanced biodegradation (aerobic and anaerobic).

Mr. Vogl's expertise includes assessment and remediation of contamination of soil and groundwater with petroleum hydrocarbons, both as dissolved phase (benzene, toluene, ethylbenzene, xylenes [BTEX] and methyl tertiary-butyl ether [MTBE]) and light nonaqueous phase liquid (LNAPL). Mr. Vogl has managed and worked on numerous large-scale groundwater restoration projects at petroleum refining and storage facilities within the Los Angeles area. This work involved permitting, lead agency liaison, and assessment and remediation of soil and groundwater affected by dissolved phased hydrocarbons and LNAPL. In addition, Mr. Vogl has conducted numerous assessments and remediations of hydrocarbon-affected soil and groundwater at gasoline service stations for a number of major petroleum marketing corporations. His master's thesis consisted of design, implementation, and evaluation of a field baildown test for determining the actual mobile thickness of LNAPL in the geologic formation surrounding a monitoring well within an LNAPL plume. In addition, he has successfully remediated a number of sites with petroleum hydrocarbon-affected soil using bioremediation.

Mr. Vogl has also spearheaded numerous hydrogeological evaluations of landfill impacts on aquifers and adjoining parcels. He has served as the director of complex investigations and critical evaluations of landfill impacts on water quality.

Mr. Vogl has also conducted dozens of geotechnical investigations and provided geotechnical oversight on numerous projects in Southern California for both contaminated and non-contaminated properties.

EXAMPLE PROJECTS:

Litigation support for two separate operators of a former circuit board manufacturing facility in Santa Ana, California. The former circuit board manufacturing facility, which had multiple operators, was responsible for a release of 1,1,1-TCA to soil and groundwater beneath the facility that was alleged to be threatening an Orange County Water District production well. The 1,1,1-TCA release had degraded to 1,1-DCE and 1,1-DCA, and also contained a solvent stabilizer 1,4-dioxane. To complicate matters, the 1,1,1-TCA release was comingled with a separate 1,1,1-TCA and TCE release from an upgradient offsite source and a separate offsite downgradient TCE plume. Through in-depth evaluation of existing Site Assessment and remediation data for the Site which were conducted at the direction of the California Regional Water Quality Control Board Santa Ana Region, and half-life calculations for abiotic degradation of 1,1,1-TCA, we were able to prove that the 1,1,1-TCA release occurred during the operation by a third operator and that neither of the two defendants could have been responsible for the releases. By calculating the mass of the dissolved phase chlorinated solvent groundwater plume for multiple chemicals of concern over multiple time frames, we were also able to demonstrate that the 1,1,1-TCA, 1,1-DCE, 1,1-DCA, and 1,4-Dioxane dissolved phase groundwater plumes were stable and naturally attenuated, and as such they were not a threat to the Orange County Water District production well in question.

Conducted a detailed hydrologic investigation for the County of Los Angeles Sanitation District in Palmdale and Lancaster that involved installation of multiple deep stainless steel monitoring wells (250-350 feet deep) to determine aquifer properties and evaluate whether the use of reclaimed water for irrigation was having a negative impact on regional water quality within the groundwater basin.

Conducted a detailed hydrogeologic assessment of an aquifer system within the South Belridge Oil field to determine if fracking was having a negative impact on the water quality of the underlying aquifer system. Including installation, sampling, and testing of multiple wells to depths of over 300 feet bgs to characterize water quality, groundwater flow direction, and velocity.

Litigation support and expert opinion for a chlorinated solvent release to soil, soil vapor, and groundwater overlying a large groundwater contaminant plume that was part of a much larger superfund site. Included detailed analysis and in-depth assessment activities for dispute resolution between a neighboring RP and mediation meetings with the superfund site RP group. Through the construction and use of a 3-D visual model for soil, soil vapor, and groundwater we were able to clearly demonstrate to the Regional Water Quality Control Board and the RP Group that our client was not the source of the large chlorinated solvent plume underlying the neighboring properties.

Expert witness and litigation support for groundwater intrusion issues within a basement that lead to mold issues throughout the house. The groundwater intrusion issues were the result of

water leaks on an upslope property from various sources including irrigation lines and swimming pool in Pasadena, California.

Expert witness and litigation support for hydrology and storm drain design issues that lead to flooding of two properties during a two separate storm events in La Canada Flint Ridge, California.

Conducted soil and groundwater assessment at the former Golden West Refinery in Santa Fe Springs involving numerous wells and soil borings. Performed soil and groundwater remediation including soil excavation, disposal, and confirmation sampling; vapor extraction pilot testing; design and installation of a large scale property wide vapor extraction system integrated with commercial/industrial development of the property; and installation of a free product and groundwater boundary recovery system integrated within existing and planned commercial/industrial development of the former refinery property.

Conducted RI/FS and RAP preparation and implementation for the City of La Mirada Redevelopment Agency for a residential redevelopment project with DTSC as the regulatory agency. The project included a Phase I Site Assessment, Phase II Site Assessment, Remedial Action Plan and Feasibility Study, and Remedial Action Implementation and involved public participation, a CEQA negative declaration, and risk assessment for multiple VOC impacted soils for a multiple parcel/multiple owner project, and included valuation of identified environmental impacts for negotiations of fair market value of the properties for purchase by the Redevelopment Agency. The Site received a No Further Action letter from DTSC for unrestricted residential development. The NFA letter also included language protecting the City and developer from future claims using the Polanco Act.

Conducted soil and groundwater assessment and remediation for two separate former gasoline stations for a major oil company for petroleum releases involving benzene and fuel oxygenated compounds including MTBE and TBA in the Charnock Groundwater Basin in Santa Monica.

Conducted soil and groundwater assessment and prepared a remedial action plan for monitored natural attenuation for a major oil company along a historic petroleum pipeline corridor in the Port of Los Angeles, the RWQCB, Los Angeles Region was the lead regulatory agency.

Conducted third party oversight for a large groundwater remediation project involving chlorinated solvents in Orange County, California, for a settlement trust for multiple RPs.

Conducted soil and groundwater remediation and site closure for two separate chlorinated solvent plumes for the City of La Mirada Redevelopment Agency. The project included litigation against past tenants.

Conducted soil and groundwater assessment and remediation activities for a large dry cleaner client at a number of facilities within various counties throughout southern California.

Conducted over 500 soil and groundwater assessments and remediations for petroleum hydrocarbon contamination involving MTBE for a major oil company in California. Remediation techniques included soil vapor extraction, air sparging, multi-phase extraction, dual-phase extraction, ozone sparging, and pump and treat technologies.

Conducted expert witness and testimony regarding the extent and nature of contamination of an oil field producing property in La Habra, California with respect to contamination caused by crude oil.

Conducted expert witness and testimony related to contamination of two separate properties by previous tenants in the Culver City, California. Contaminants included petroleum hydrocarbons and VOCs in soil and groundwater.

Conducted the largest sediment study performed to date for the Salton Sea. The Study included over 50 grab sediment samples and fifteen 6 foot deep cores over the entire length of the Sea. Contaminants of concern included pesticides, PCBs, VOCs, SVOCs, and heavy metals, including selenium. This study was conducted for the Salton Sea Authority to aid in determination of the overall health of the Sea and the potential impacts of pollutants on the flora and fauna, especially avian species that were dying at the Sea. Testified at California State Water Resources Control Board hearing regarding the state of the Salton Sea with respect to contamination issues.

Conducted soil remediation related to a UST removal. Following completion of backfill activities, testing information provided by contractor revealed that the soil used for backfill contained PCBs. After a detailed evaluation was performed with respect to the laboratory results, it was determined that the PCBs detected were a result of false positive results from the laboratory in question. Successfully demonstrated that the fill material actually did not contain PCBs and received a NFA letter for the client.

Project manager of multi-million dollar capped-cost remediation of chlorinated solvent (TCE) soil and groundwater plume in Central Coast. Project involved multiple party lawsuits and a settlement trust.

Conducted assessment and remediation of former garage facility that contained hydraulic lifts that were found to contain PCBs. Included removal of hydraulic lifts and PCB contaminated hydraulic oil and PCB impacted soils.

Technical director of chlorinated solvent remediation involving soil vapor extraction and potassium permanganate injection for treatment of TCE groundwater plume. This was the first WDR permitted potassium permanganate injection under the CRWQCB, Los Angeles Region performed in Los Angeles County.

Project manager of a detailed hydrogeologic assessment that included geologic logging, well installation, slug tests, pump tests, packer tests, and monitoring and dewatering system design for Subsurface Barrier No. 4 at the Puente Hills Landfill.

Conducted a detailed cost evaluation of remedial alternatives for a Ventura County refinery and tank farm.

Directed a detailed assessment of four parcels that are part of a former landfill for purchase and development as industrial property.

Performed emergency response measures and detailed evaluation of a jet fuel release to San Diego Creek for a major petroleum pipeline company as part of a natural resource damage assessment (NRDA) with the Department of Fish and Game OSPR as the regulatory agency.

Performed a detailed evaluation of a proposed insured remediation project for cleanup of soil and groundwater at a former refinery site in southern California.

Conducted litigation support and assisted with expert witness testimony for over twenty separate petroleum retail sites in California, Nevada, and Oregon.

Conducted a detailed hydrogeologic assessment for litigation project involving millions of dollars of structural damage to homes as a result of land movement and subsidence in Simi Valley, California. Project involved expert opinion.

Assisted in litigation support and provided expert witness for insurance claims related to hexavalent chromium contamination of soil and groundwater related to a former chrome plating facility in Los Angeles, California.

Conducted detailed soil and groundwater assessment for litigation project involving petroleum hydrocarbon releases, including litigation against former environmental consultants. Project also included bioremediation of remaining petroleum impacted soils and received a NFA letter from the RWQCB, Los Angeles.

Conducted a soil and groundwater assessment and remediation of a petroleum pipeline release (including gasoline, naphtha, and diesel) in Southern California. Soil remediation was conducted via vapor extraction and LNAPL recovery is being performed via vacuum enhanced product recovery. Over 40,000 gallons of LNAPL were recovered.

Developed, managed, and conducted bioremediation of 30,000 cubic yards of TPH-, VOC-, and SVOC-affected soil. Received a NFA letter from the RWQCB, Los Angeles.

Developed, managed, and conducted soil remediation of over 20,000 cubic yards of TPH-affected soil. Received a NFA letter and the property was successfully redeveloped.

Conducted soil investigation and remediation of over 100 former sump and tank locations at 80-year-old active oil field.

Managed and conducted soil and groundwater remediation of halogenated volatile organic compound release in Orange County, California.

Managed and conducted RI/FS of soil and groundwater affected by heavy metals including antimony, lead, arsenic, and selenium at a battery recycling facility in El Florido, Baja, California. The project was performed for the Mexican equivalent to the EPA and involved international litigation against the former tenant for illegal disposal of waste on the property across international borders.

Developed, managed, and conducted soil and groundwater assessments and remediations at gasoline service stations in Santa Barbara, Ventura, Los Angeles, Riverside, San Bernardino, and San Diego counties in Southern California.

Managed and conducted monitoring well baildown tests to estimate the true volume of free phase jet fuel that was present on the water table at the Paramount Petroleum storage facility in Lakewood, California.

Managed and conducted a groundwater assessment at a coatings manufacturing facility in Southern California.

Managed and implemented large-scale groundwater assessment and remediation at a GATX petroleum storage facility in Los Angeles Harbor.

Developed and managed soil and groundwater investigation at an aluminum wheel manufacturing facility in Orange County, California.

Managed, designed, and installed a liquid hydrocarbon recovery system at a GATX petroleum storage facility in the Los Angeles Harbor area.

Conducted an aquifer characterization at the Paramount Petroleum refinery in Paramount, California.

Conducted an aquifer characterization at a large GATX petroleum storage facility in Carson, California.

Implemented a large-scale total fluids recovery system at an ARCO refinery in Carson, California.

Managed and implemented a large-scale groundwater assessment and remediation involving multiple types of free phase liquid hydrocarbons at a petroleum storage facility in Los Angeles Harbor, California. This project included a detailed aquifer characterization that involved numerous pumping step tests, long-term pump tests, and slug tests.

Developed and implemented a verification soil sampling plan and groundwater monitoring program for a large-scale heavy metal-contaminated (predominantly lead) soil remediation project in Riverside, California.

PROFESSIONAL EXPERIENCE

April 2013 to Present – Waterstone Environmental, Inc. – Principal Hydrogeologist

September 2011 to April 2013 – SAIC – Senior Principal Hydrogeologist

2001 to September 2011 - GeoHydrologic Consultants, Inc. – CEO/CFO, Principal Hydrogeologist

1991-2001 – Levine Fricke Recon – Principal Hydrogeologist, Geoscience Group Manager, Technical Group Leader Southwest Region

1990-1991 – Riedel Environmental – Senior Hydrogeologist

1987-1990 – Engineering Enterprises Inc.-Staff, Senior Staff, and Project Hydrogeologist

1985-1987 - Roscoe Moss Company – Monitoring Well Division, Sales and Technical Assistance

REGISTRATIONS: Certified Engineering Geologist: California, No. 2036
Certified Hydrogeologist: California, No. HG-47
Professional Geologist: California, No. 5526

Qualified Industrial Storm Water Practitioner (QISP)

EDUCATION: University of California Irvine Extension: Certificate in Environmental Site Assessment and Remediation, 1993

California State University, Los Angeles: M.S. Geology, 1990

California State University, Los Angeles: B.S. Geology, 1987

Cypress Junior College: A.S., 1984

PUBLICATIONS AND PRESENTATIONS

Vogl, R.A. 2011. *Bringing TBA Sites to Closure*, AEHS Foundation 21st International Conference on Soils, Water, Energy, and Air, San Diego, California, March 14-17, 2011.

Vogl, R.A. 2009. *Treatment of MTBE and TBA in the Stadium Conglomerate*, The 19th Annual AEHS Meeting and West Coast Conference on Soils, Sediments, and Water, In-Situ Ozone Remediation in Difficult Conditions Session, San Diego, California, March 9-12, 2009.

Vogl, R.A. 2009. *Elements of LUFT Remedial Design*, California United Program Annual (CUPA) Training Conference, "CUPA, The Next Generation", Garden Grove, California, January 25-29, 2009.

Vogl, R.A. 2008. *Time Limited Treatment of TBA*, The 18th Annual AEHS Meeting and West Coast Conference on Soils, Sediments, and Water, Ozone Oxidation Milestones Session, San Diego, California, March 10-13, 2008.

Vogl, R.A. 2007. *Treatment of TBA at Garden Grove Service Stations*, 2007 World Congress on Ozone and Ultraviolet Technologies, Soil and Groundwater Treatment Session, Los Angeles, California, August 27-29, 2007.

Vogl, R.A. 2007. *The Use of Ozone Sparging as the Final Sequenced Remedial Measure for MTBE and TBA*, The Seventeenth Annual AEHS Meeting and West Coast Conference on Soils, Sediments, and Water, Ozone Barriers and Breakthroughs Session, San Diego, California, March 19-22, 2007.

Vogl, R.A., C.J. Lewis. 2006. *Treatment of TBA at Two Garden Grove Sites*, The Sixteenth Annual West Coast Conference on Contaminated Soils, Sediments and Water, In-Situ Chemical Oxidation Session, San Diego, California, March 13-16, 2006.

Odenrantz, J.E., M.D. Varljen and R.A. Vogl. 2003. *Natural Attenuation Rate Clarifications: The True Picture is in the Details*, Soil & Sediment Contamination, An International Journal, Volume 12, Issue 5, CRC Press, Lewis Publishers, pages 663-672.

Odenrantz, J.E., R. A. Vogl, M.D. Varljen and A. Silva. 2003. *Detailed Examination of Governing Processes in a Natural Attenuation Setting: Zone of Enlightenment*, The

Thirteenth Annual West Coast Conference on Contaminated Soils, Sediments, and Water, San Diego, California, March 17-20.

- Vogl, R.A., R.N. Henry. 2002. Characteristics and contaminants of the Salton Sea Sediments, Developments in Hydrobiology, The Salton Sea. Kluwer Academic Publishers, pages 47-54.
- Odenrantz, J.E., R. A. Vogl, M.D. Varljen and A. Silva. 2002. Natural Attenuation Rate Clarifications: The Devil's in the Details, The American Petroleum Institute and National Ground Water Association's Petroleum Hydrocarbons and Organic Chemical in Ground Water- Prevention, Assessment, and Remediation with Special Focus on Long-Term Site Management and Gasoline Oxygenates, Atlanta, Georgia, November 6-8.
- Crother, R.A., R.A. Vogl. 2002. Changes in Water Quality Due to Potassium Permanganate Injection, The Second International Conference on Oxidation and Reduction Technologies for In-Situ Treatment of Soil and Groundwater, Toronto, Canada.
- Odenrantz, J.E., M.D. Varljen and R. A. Vogl. 2002. Natural Attenuation Rate Clarifications: The Devil's in the Details, The 18th Annual International Conference on Contaminated Soils, Sediments and Water, Analysis, Site Assessment, Fate, Environmental and Human Risk Assessment, Remediation and Regulation. University of Massachusetts at Amherst, October 21-14.
- Odenrantz, J.E., M.D. Varljen and R.A. Vogl. 2002. Natural Attenuation: Is Dilution the Solution? LUSTLINE, Bulletin 40, New England Interstate Water Pollution Control Commission and the U.S. Environmental Protection Agency, pages 8-12.
- Vogl, R.A., R.A. Crother. 2002. In-Situ Chemical Oxidation Potassium Permanganate, The Twelfth Annual West Coast Conference on Contaminated Soils, Sediments and Water, Workshop on In-Situ Chemical Oxidation, San Diego, California.
- Vogl, R.A. 2001. Characteristics and Contaminants of the Salton Sea. The First International Congress on Petroleum Contaminated Soils, Sediments, & Water, Platform presentation and poster session, Imperial College, London, United Kingdom.
- Vogl, R.A. 2001. Overview of Hexavalent Chromium Remedial Technologies, Orange County Bar Association Environmental Chapter, Costa Mesa, California.
- Vogl, R.A. 2001. Hexavalent Chromium Remediation Case Study. Presentation at LFR Annual Technical Conference, Lake Tahoe, CA, Platform Presentation.
- Vogl, R.A. 2000. Free Product Recovery "When to Pump and When to Bail". Presentation at LFR Annual Technical Conference, Lake Tahoe, CA, September, Platform Presentation.
- Vogl, R.A., S.C. Beadle, R.N. Henry, and D.S. Lipton. 2000. Sediment Contaminants of the Salton Sea, The Tenth Annual West Coast Conference on Contaminated Soils and Groundwater, San Diego, California, March 20-23, Platform Presentation.

- Vogl, R.A., R.N. Henry, and D.S. Lipton. 2000. Sediment Characteristics and Contaminants of the Salton Sea, Salton Sea Symposium, Desert Hot Springs, California, January 13-14, Platform Presentation.
- Vogl, R.A., R.N. Henry, and D.S. Lipton. 2000. Sediment Characteristics and Contaminants of the Salton Sea, Salton Sea Symposium, Desert Hot Springs, California, January 13-14, Poster Presentation.
- Vogl, R.A., R.N. Henry, and D.S. Lipton. 1999. Sediment Contaminants of the Salton Sea, North American Lake Management Society, Symposium '99, 21st Century Gold, Reno, Nevada, December 1-4, Platform Presentation.
- Vogl, R.A., R.N. Henry, and D.S. Lipton. 1999. Sediment Contaminants of the Salton Sea. In Wetlands & Remediation: An International Conference, Salt Lake City, UT, November 16-17, Jeffrey L. Meand, Ph.D., Robert E. Hinchee, Ph.D., P.E., eds. Battelle Press, Columbus Ohio, pp. 41-48.
- Vogl, R.A., R.N. Henry, and D.S. Lipton. 1999. Sediment Contaminants of the Salton Sea. In Wetlands & Remediation: An International Conference, Salt Lake City, UT, November 16-17, Platform Presentation.
- Henry, R.N., R.A. Vogl, and J.W. Vogler. 1999. Agricultural Contaminants of the Salton Sea Sediments. Presentation at the Wetlands for Wastewater Recycling Conference, Baltimore, MD. November 3-5, Platform Presentation.
- Vogl, R.A. 1999. Sediment Contaminants of the Salton Sea. Presentation at LFR Annual Technical Conference, Lake Tahoe, CA, September, Platform Presentation.
- Vogl, R.A. 1998. Case History of Two Sites Closed Using Natural Attenuation Argument with Chlorinated Solvents in Groundwater. Presentation at LFR Annual Technical Conference, Lake Tahoe, CA, September, Platform Presentation.
- Vogl, R.A. 1997. Bioremediation of Crude Oil Contaminated Soil. Presentation at LFR Annual Technical Conference, Lake Tahoe, CA, September, Platform Presentation.
- Vogl, R.A. 1996. Performing Simplistic Volume Calculations for Hydrocarbon Releases. Presentation at LFR Annual Technical Conference, Lake Tahoe, CA, September, Platform Presentation.
- Vogl, R.A. 1995. Determination of True LNAPL Thickness Using Monitoring Wells. Presentation at LFR Annual Technical Conference, Lake Tahoe, CA, September, Platform Presentation.
- Vogl, R.A. 1990. Measurement of true hydrocarbon thickness using borehole data versus monitoring wells. Masters Thesis submitted to the Graduate College, California State University Los Angeles, Los Angeles, California.