

GeoHydrologic Consultants, Inc.

RICHARD A. VOGL, P.G., C.HG., C.E.G.

Principal Hydrogeologist

*Phase I site assessment
Phase II site assessments
soil and groundwater remediation
geotechnical investigations
litigation support and expert witness*

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 is a registered Geologist, Certified Hydrogeologist, and Certified Engineering Geologist in the state of California. His credentials in the state of California, along with his over 20 years of professional experience, has led to work on numerous projects involving litigation support and expert witness testimony.

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.

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 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 and heavy metals. In addition, he has successfully remediated a number of sites with petroleum hydrocarbon-affected soil using bioremediation. 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.

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

REPRESENTATIVE EXPERIENCE

Conducted over 400 soil and groundwater assessments and remediations for petroleum hydrocarbon contamination involving MTBE for a major oil company in California. This work has included evaluation of groundwater production wells within a one mile radius of the sites, and a detailed evaluation of MTBE travel time to these potential receptor wells. Remediation for soil and groundwater has included vapor extraction, dual-phase extraction, air sparging and vapor extraction, ozone sparging, and groundwater extraction and treatment.

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. Included determination of the volume of contamination, evaluation of applicable remedial measures, and cost for cleanup.

Conducted expert witness and testimony related to contamination of two separate properties by previous tenants in the Los Angeles area. Contaminants included a number of different volatile organic compounds and contamination of soil and groundwater beneath both properties. Included regulatory interface and cleanup of the properties to obtain a no further action letter from the RWQCB. Testimony included determination of applicable cleanup levels and an in depth evaluation of past investigation activities with respect to cleanup standards and actions.

Conducted the largest sediment study performed to date for the Salton Sea, which is the largest inland lake in California. 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. This study included collection of approximately 75 grab samples throughout the entire distribution of the Sea including all major tributaries, and approximately 15 six-foot long core samples. Over one hundred samples were analyzed for volatile organics, semi-volatile organics, metals and metalloids, PCBs, and pesticides. Sediment samples were also analyzed for grain size distribution. The Study determined that there were a number of areas that contained elevated concentrations of cadmium, copper, zinc, molybdenum, and selenium.

Conducted soil and groundwater remediation for two separate chlorinated solvent plumes for the City of La Mirada Redevelopment Agency. Project included cost recovery for the City from past tenants for the environmental impacts. Received closure for one of the chlorinated solvent

groundwater plumes using monitored natural attenuation and closure for soil impacts to the second plume following successful completion of vapor extraction at the site. This plume is currently being monitored for natural attenuation.

Project manager of multi-million dollar capped-cost remediation of chlorinated solvent (TCE) soil and groundwater plume in Central Coast. Technologies being implemented are vapor extraction for soil and HRC injection for groundwater, with monitored natural attenuation.

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

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. Work was performed for a law firm that represented multiple insurance companies regarding site remediation costs.

Directed a detailed assessment of four parcels that are part of a former landfill for purchase and development as industrial property. Project included assessment of soil gas, soil, and groundwater, estimating costs of remediation, and estimating risks associated with purchase and development of these properties.

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). All work was done under threat of enforcement actions from the Department of Fish and Game's Oil Spill Response Unit. Project included collecting soil and water samples for the client as well as Fish and Game split samples in the presence of Fish and Game representatives. Visually inspected the flora and fauna of the creek to evaluate the relative impacts of the release to these receptors. Collected over 100 samples at the spill site with two separate teams that were accompanied by Fish and Game at all times. Performed detailed characterization of residual petroleum hydrocarbons that were left behind in the creek sediments and water following the release, and determined acceptable mitigation options.

Performed a detailed evaluation of a proposed insured remediation project for cleanup of soil and groundwater at a former refinery site in southern California. Work was conducted for a Los Angeles law firm representing a potential purchaser of the property. Contaminants included LNAPL, petroleum hydrocarbons as gasoline, diesel, crude oil, BTEX, MTBE, and Organic Lead. Project included evaluation of remedial approach, project costs, feasibility, cleanup levels, and regulatory interface.

Conducted litigation support and assisted with expert witness testimony for over twenty separate petroleum retail sites in California, Nevada, and Oregon. These sites involved multiple releases over time for multiple owners. Performed multiple volume estimates of release to soil and

groundwater including dissolved phase BTEX and MTBE and free product, to determine dates of releases and allocate responsibility.

Performed assessment of soil and groundwater with respect to chlorinated solvent releases. Work was conducted directly for the Los Angeles County Superior Court and was related to a contamination dispute. Project involved determining estimates of volumes released and responsible parties.

Performed assessment of soil related to petroleum hydrocarbon and chlorinated hydrocarbon releases. Work was conducted directly for Los Angeles County Superior Court and was related to the sale of contaminated property.

Conducted soil and groundwater assessment and remediation for the property owner in conjunction with litigation against former site tenants. Involved multiple chlorinated solvents and plumes in Los Angeles County, California.

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 soil and groundwater contamination related to a former plating facility. Project involved numerous metals including hexavalent chromium.

Conducted detailed soil and groundwater assessment for litigation project involving petroleum hydrocarbon releases, including litigation against former environmental consultants. Received RWQCB closure for soil and groundwater issues at the site, including bioremediation of remaining TPH-affected soil.

Conducted a soil and groundwater assessment and remediation of a petroleum pipeline release (including gasoline, naptha, and diesel) in Southern California. Soil remediation is being conducted via vapor extraction and LNAPL recovery is being performed via vacuum enhanced product recovery. Over 40,000 gallons of LNAPL has been recovered to date. Project included coordination with multiple property owners and regular interface with the RWQCB. Investigation included a commingled plume from a separate source of gasoline containing MTBE.

Developed, managed, and conducted bioremediation of 30,000 cubic yards of TPH-, VOC-, and SVOC-affected soil. Project included regulatory interface and project management for all remediation activities at a 6-acre site that was a former gas plant. Obtained RWQCB closure for soil and groundwater at the site.

Developed, managed, and conducted soil remediation of over 20,000 cubic yards of TPH-affected soil. Obtained RWQCB closure for soil issues at the site.

Conducted soil investigation and remediation of over 100 former sump and tank locations at 80-year-old active oil field. Contaminants included TPH, VOCs, SVOCs, and metals.

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.

Developed, managed, and conducted soil and groundwater assessments and remediations at gasoline service stations in Santa Barbara, Los Angeles, and Riverside 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. The site had both a LNAPL solvent plume and a dissolved solvent plume in groundwater.

Managed and implemented large-scale groundwater assessment and remediation at a GATX petroleum storage facility in Los Angeles Harbor. Project involved multiple types of free phase liquid hydrocarbons.

Developed and managed soil and groundwater investigation at an aluminum wheel manufacturing facility in Orange County, California. Soil and groundwater at the site had been affected by halogenated volatile organics and petroleum hydrocarbons.

Managed, designed, and installed a liquid hydrocarbon recovery system at a GATX petroleum storage facility in the Los Angeles Harbor area. The recovery system consisted of approximately 50 shallow recovery wells and 70 monitoring wells.

Conducted an aquifer characterization at the Paramount Petroleum refinery in Paramount, California. Data from the aquifer characterization were used to design an on-site containment groundwater recovery system.

Conducted an aquifer characterization at a former underground storage tank location in San Diego, California. Project included installation of a groundwater remediation system for liquid and dissolved-phase hydrocarbons.

Conducted an aquifer characterization at a large GATX petroleum storage facility in Carson, California. Data from the aquifer characterization were used to design a free phase liquid hydrocarbon and on-site contaminant groundwater recovery system.

Implemented a large-scale total fluids recovery system at an ARCO refinery in Carson, California. Under Mr. Vogl's operation this recovery system, which was comprised of approximately ten recovery wells, produced a total of 150 barrels of free phase liquid hydrocarbon daily.

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.

REGISTRATIONS

Certified Engineering Geologist: California, No. 2036

Certified Hydrogeologist: California, No. HG-47

Professional Geologist: California, No. 5526

Registered Geologist: Arizona, No. 26396

Registered Geologist: Oregon, No. G1456

PUBLICATIONS AND PRESENTATIONS

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.

- Odenchantz, 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.
- Odenchantz, 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.
- Odenchantz, 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.
- Odenchantz, 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.
- Odenchantz, 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.