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JAMES A. JACOBS
P.G., C.H.G., C.P.G., C.Pet.G., ToR QSP/QSD
Principal Hydrogeologist and Environmental Scientist

Education

M.A. Geology, University of Texas, Austin, TX, 1981
B.A. Geology, English, Franklin and Marshall College, Lancaster, PA, 1978

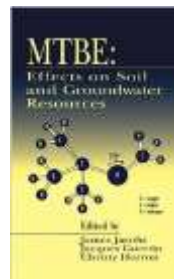
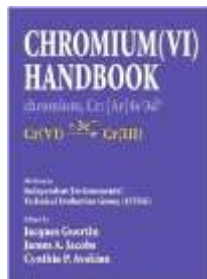
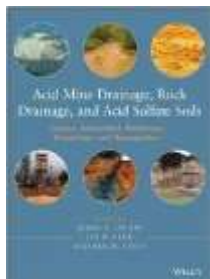
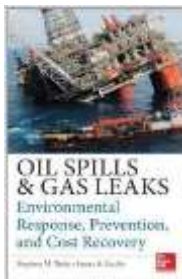


James Jacobs has more than two decades of experience as a certified hydrogeologist, licensed well driller and general engineering contractor. He has led multi-disciplinary teams of scientists and engineers and has designed and installed water treatment systems for groundwater, stormwater and surface water impacted by petroleum hydrocarbons, MTBE, metals, chlorinated solvents, and suspended solids. He has installed and worked on water treatment projects using enhanced bioremediation (aerobic, co-metabolic, and anaerobic), in-situ chemical oxidation, in-situ chemical reduction, biofiltration, phytoremediation, dual phase extraction, vapor extraction, pump and treat, metals stabilization, and filtering. He has worked on EPA Superfund sites, military bases, agricultural and industrial properties. Since 1990, he has been a co-owner of an environmental-engineering consulting and contracting company, where has performed more than 1,000 projects. Many of his projects have focused on water quality as well as economically sustainable approaches mining and resource extraction.

As a publicly elected community services district board member since 2002, he has evaluated numerous environmental challenges, solved sustainability problems, and worked with others as a team leader to develop agency policies. He has been involved with the public process of goal setting, data acquisition, development of workplans, and implementation of field projects. He has promoted and supported sustainable environmental practices within the agency, a certified green business which now offers residents recycling of electronic waste, fluorescent bulbs, medicines, batteries, paper and cardboard. In an effort to minimize local groundwater degradation, in 2009, 1 million less lbs of waste were processed by the agency than in 2006. In 2013, the agency won the Marin County Green Business of the Year award due to the successful recycling efforts and reduction in wastes shipped to the local landfills. For mentoring students, he is the AIPG Sponsor of the UC Davis Geology Student Section (since 2010) and Sonoma State University Geology Student Section (since 2016).

Subject Matter Expert / Publications

He has been involved as a hydrogeologist and water expert witness on hundreds of legal cases, testifying in 16 cases over the past 25 years. He has been a member of the National Ground Water Association (NGWA) since 1989, and he received the NGWA Fellows Award in December 2016. He developed, co-authored and edited books on environmental topics such as MTBE (2000; CRC Press), Chromium(VI) (2005; CRC Press) and most recently, Acid Mine Drainage, Rock Drainage and Acid Sulfate Soils (2014; John Wiley and Sons, Inc.), and Oil Spills and Gas Leaks: Environmental Response, Prevention, and Cost Recovery (2014, McGraw-Hill). He is currently writing a book on environmental impact evaluation of hydraulic fracture stimulation (commonly called ‘fracking’) for Wiley. He has written over 100 articles and given over 50 technical presentations. He has explained complex water issues to California legislators and in Washington, D.C. during legislative meeting days.





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Peer Review

Mr. Jacobs serves in a peer review capacity for several organizations. He served from 2006 to 2011 on the Fulbright Peer Review Committee, screening potential Fulbright scholars in environmental sciences. From 2005 to 2010, he served on the National Screening Committee for the American Institute of Professional Geologists for candidates applying for the Certified Professional Geologist designation. Since 2005, he has been on the Advisory Board for the Association for Environmental Health and Sciences. The duties include the review of abstracts submitted for presentations for the annual San Diego, California Soils, Sediments, and Water conference and reviewing student presentations. For litigation support services, offered since 1990, professional peer review is occasionally required. In October 2011, Jacobs performed a peer review for the University of California of the 2007 PG&E Hinkley, California (subject of *Erin Brockovich* movie) Background Study Report.

International Experience

Jacobs has taught classes and workshops on groundwater sustainability and management to groups of students, professors, consultants, and regulators in Jamaica, Israel, Germany and India.

Academic Awards and Fellowships

1981: R.K. DeFord Field Scholarship Award; University of Texas at Austin
2003: Fulbright Senior Scholar Award, Univ. of West Indies, Kingston, Jamaica; February–March;
2004: Fulbright Senior Scholar Award, Univ. of West Indies, Kingston, Jamaica; March–April;
2008: Fulbright Senior Scholar Award, Afeka Engineering College, Tel Aviv, Israel; March–April;
2007–2011: Selected and Served on Fulbright Peer Review Committee; CIES
2012: Fulbright Senior Scholar Award, SRTM University, Nanded, India; January – February;
2016: Virtual Fellow, U.S. Department of State, Cabo Verde’s Road Map to 100 Percent Renewable Energy
2016: National Groundwater Association: Fellow

Professional Awards

1999–2004: Elected to the Board of Directors, Groundwater Resources Association of California
1996–1998; 2009–2010: Elected President of San Francisco Branch, Groundwater Resources Association
1998: Groundwater Resources Association; President’s Tribute Certificate
2000: Elected National Advisory Board, American Institute of Professional Geologists
2001: American Institute of Professional Geologists, National Presidential Certificate of Merit
2004: California Council of Geosciences (CCGO) “Gold Award”
2010: American Institute of Professional Geologists, National Presidential Certificate of Merit
2005–2017: Science Advisory Board, Association for Environmental Health and Sciences
2011: American Institute of Professional Geologists: Honorary Membership Award
2013: American Institute of Professional Geologists: Elected National AIPG Vice President
2015: American Institute of Professional Geologists: Martin Van Couvering Memorial Award

Publicly Elected Positions

2002–2017: Director : Tamalpais Community Services District; President or Vice President (2004-2012)
2002–2017: Commissioner: Sewerage Agency of Southern Marin; Vice President (2008), President (2009-2011)

Certifications and Licenses

Certified Petroleum Geologist, American Association of Petroleum Geologists, #6231
Certified Professional Geologist, American Institute of Professional Geologists, # 7760
Licensed Professional Geologist: California #4815; Alaska #A227, Arizona #39066, Idaho #693, Oregon #G-1147, Pennsylvania: # 1152G, Texas Geology #11552, Wyoming: #PG-2328, Washington #1815
Certified Hydrogeologist: California #0088, Washington #1815
Registered Environmental Assessor I: California # 1511; REA II: #20171 (program discontinued).
Registered Asbestos Inspector: AHERA Accredited; OLA Registration # 0000450
California Qualified Stormwater Pollution Prevention Plan Developer (QSD) and Preparer (QSP); Certificate #21430
QSD/QSP Trainer of Record (ToR); July 2016
CSLB License #624461: Driller (C-57), General Engineering, Hazardous Materials Removal, Asbestos Abatement
California Commercial Driver License: C with Hazmat Endorsement



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Professional History

1990- present; Geologist; The Auger Group, Inc., dba Clearwater Group.
1989-1990 Project Geologist, Harding & Lawson Associates (now MACTEC), Novato, California
1986-1989 Senior Oil Geologist, Petrofina Delaware (now Total), Houston, Texas
1981-1985 Exploration Oil Geologist, SOHIO Petroleum (now BP), San Francisco, California and Anchorage, Alaska
1975-1978 Technician, U.S. Bureau of Mines, Coal Research Station

Professional Societies

National Ground Water Association (NGWA), American Institute of Professional Geologists (AIPG), Groundwater Resources Association of California (GRAC), American Association of Petroleum Geologists (AAPG), ASTM International, Forensic Expert Witness Association (FEWA), California Council of Geoscience Organizations (CCGO), and CORE Foundation. He has served as an elected officer of AIPG, CCGO, CORE, and GRAC.

Classes and Workshops Taught

Jacobs designed and taught the Sustainable Remediation Methods for Soils and Water (X-451) for the University of California, Berkeley Extension program in the spring semester 2011 and in fall semester 2011. Jacobs has taught other environmental workshops and graduate classes focused on sustainable environmental practices, recycling, and practical remediation efforts at the University of West Indies (Mona Campus), Jamaica (1 grant was for 20 days of instruction); Afeka Engineering College, Israel (40 hours of instruction, with others), and SRTM University, India (42 hours of instruction, with others). A complete list classes and workshops is included below.

Professional Associations

American Association of Petroleum Geologists: Active Member 1979 to present
American Institute of Professional Geologists (AIPG); Elected National AIPG Advisory Board: 2000; Elected National AIPG Vice President; 2012; Sponsor of University of California at Davis AIPG Student Chapter: 2010-present
California Council of Geoscience Organizations (CCGO):
Groundwater Resources Association of California (GRAC), Director, Groundwater Resources Association 1999 - 2004
Forensic Expert Witness Association; Member (FEWA); 2014 to present
National Ground Water Association (NGWA); Member 1989 to present
Association for the Environment, Health and Sciences (AEHS); Member since 2002,
ASTM International (American Society of Testing Materials); D-18 Committee Member: 2014 to present
CORE Environmental Foundation (non-profit): Co-founder and President 2009-2011
ECON Magazine - Editorial Advisory Board, 1994 to 1996

Publications - Technical Books: Books co-authored by James Jacobs:

Testa, S., and Jacobs, J., 2014, *Oil Spills and Gas Leaks: Environmental Response, Prevention, and Cost Recovery*, McGraw-Hill Education, New York, NY; 578 p.

Jacobs, J., Testa, S. and Lehr, J., eds., 2014, *Acid Mine Drainage, Rock Drainage and Sulfate Soils: Causes, Assessment, Prediction, Prevention, and Remediation*, John Wiley, & Sons, Inc., Hoboken, NJ; 486 p., Jacobs co-authored half of the articles in this volume.

Guertin, J., Jacobs, J., and Avakian, C., eds., 2004, *Chromium (VI) Handbook*, CRC Press, Boca Raton, Florida; 784 p. Jacobs co-authored 19 of the articles in this volume.

Jacobs, J., Guertin, J., and Herron, C., eds., 2001, *MTBE and its effect on Soil and Groundwater Resources*, CRC Press, Boca Raton, Florida; 264 p., Jacobs co-authored many articles.

Jacobs, J. and Testa, S., (In Press) *Development of Alternative Oil and Gas Resources: Hydraulic Fracture Stimulation Techniques and Environmental Impact Evaluation*, John Wiley, & Sons, Inc., Hoboken, NJ.

Publications - Chapters in Books:

- 41 articles in the Water Encyclopedia, 5-Volume Set, 2005, Wiley-Interscience, Hoboken, NJ.
- 9 articles in *Standard Handbook of Environmental Science, Health, and Technology*, 2000, McGraw-Hill Handbook Series, New York, NY.



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- 2 chapters in *Handbook of Complex Environmental Remediation Problems*, 2001, McGraw-Hill Handbook Series, New York, NY.

Selected Abstracts, Articles and General Publications

Baker, S. and Jacobs, J., 1997, The Government's New Environmental Role, Sacramento Business Journal, March 17.

Goldberg, L., and Jacobs, J., 2000, Brownfields, Standard Encyclopedia of Environmental Science and Technology, J. Lehr, ed., McGraw Hill, New York, NY; p. 16.21 -16.32.

Hartman, B., and Jacobs, J., 2000, Soil Vapor Principles, Standard Encyclopedia of Environmental Science and Technology, J. Lehr, ed., McGraw Hill, New York, NY; p. 11.87 -11.95.

Hartman, B., and Jacobs, J., 2000, Applications and Interpretation of Soil Vapor Data to Volatile Organic Compound Contamination, Standard Encyclopedia of Environmental Science and Technology, J. Lehr, ed., McGraw Hill, New York, NY; p. 11.96 – 11.112.

Jacobs, J. A., Testa S.M., Alpers, C.N., and Nordstrom, D.K., 2016, An Overview of Environmental Impacts and Reclamation Efforts at Iron Mountain Mine, Shasta County, California, in *Applied Geology in California*, ed. Anderson, R., and Ferriz, H., Association of Environmental and Engineering Geologists, p. 427-446.

Jacobs, J. A., Grant Ludwig, L., 2016, Exposure to Valley Fever in California – Recent Trends and Prevention for Geologists, Construction Workers, and Related Occupations, in *Applied Geology in California*, ed. Anderson, R., and Ferriz, H., Association of Environmental and Engineering Geologists, p. 511-523.

Jacobs, O.P., Jacobs, J.A., and Pennell, K.G., 2016, Exposure Pathway Analysis Using Passive Diffusion Air Sampling Method to Sample Sewer Air in Manholes and Cleanouts: Association for Environmental Health and Sciences Foundation, 26th Annual National Conference, San Diego, California, March 23-26th, 2016, Abstracts.

Jacobs, O.P., Jacobs, J.A., and Pennell, K.G., 2016, Sanitary Sewer Contaminant Migration Study Manhole to Clean Out: Passive Sewer Air Sampling, Presence of VOCs in Sewer Manhole as a Predictor of VOCs in Sewer Lateral Cleanouts, 18th Annual California Unified Program (CUPA) Forum and Annual Training Conference, 2016, Anaheim, California, February 24, 2016, Abstracts.

Jacobs, J.A., and Jacobs, O.P., 2015, Geologists' Role in Evaluating VOCs from Illegal Drug Labs, Industrial Wastes and Household Cleaners in Sewer Air, American Institute of Professional Geologists National Meeting, Anchorage, Alaska, Abstracts, p. 38-39.

Jacobs, J.A., Jacobs, O.P., and Pennell, K.G., 2015, Updating Site Conceptual Models for Potential Sewer Gas and Vapor Intrusion Into Indoor Air From Breached Sewer Conveyance Systems, Association for Environmental Health and Sciences Foundation, 25th Annual National Conf., San Diego, California, March 23-26th, 2015, Abstracts, p. 93.

Jacobs, J.A., Jacobs, O.P., and Pennell, K.G., 2015, One Alternate Exposure Pathway of VOC Vapors from Contaminated Subsurface Environments into Indoor Air - Legacy Sewer- Plumbing Systems, *Hydrovisions*, Spring 2015, p. 20-24.

Jacobs, J.A., Jacobs, O.P., and Pennell, K.G., 2014, Geologists and Site Conceptual Models: VOCs and Sewer Gas in Indoor Air Resulting from Migration from Breached Sewer Conveyance Systems, American Institute of Professional Geologists National Meeting, Prescott, AZ, Abstracts, p. 73-74.

Jacobs, J.A., and Testa, S.M., 2014, Comprehensive Rethinking of Wastes from Mine Sites into Resources, Abstract, AEHS Proceedings March 17-20, 2014, San Diego, California.

Jacobs, J.A., 2014, Recent Trends and Prevention for a Significant Occupational Hazard for Scientists and Engineers and Other Field Workers: *Coccidioidomycosis*: (Valley Fever); Abstract, AEHS Proceedings March 17-20, 2014, San Diego, California.



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Jacobs, J.A., and Testa, S.M., 2013, The Geologist's Role in Comprehensive Rethinking of Wastes from Mine Sites into Resources; Abstracts, Proceedings October 24-25, 2013, American Institute of Professional Geologists Annual Meeting, Broomfield, Colorado.

Jacobs, J.A., 2013, Recent Trends and Prevention for a Significant Occupational Hazard for Scientists and Engineers and Other Field Workers: Coccidioidomycosis: (Valley Fever); Abstract, Proceedings October 24-25, 2013, American Institute of Professional Geologists Annual Meeting, Broomfield, Colorado.

Jacobs, J.A., and Testa, S.M., 2011, Two Metals Treatments for Soil, Sludges and Water using Green Remediation Criteria, Abstract, Proceedings September 10-14, 2011, American Institute of Professional Geologists Annual Meeting, Bloomfield, Illinois.

Jacobs, J.A., Archibald, J., and Drury, D., 2011, Sustainable Water Treatment Practices for Blue Green Algae Blooms to Restore Lakes and Reservoirs, Abstract, Proceedings September 10-14, 2011, American Institute of Professional Geologists Annual Meeting, Bloomfield, Illinois.

Jacobs, J., Adini, A., and Rau, D. 2010, Revisiting a Closed Site: Expedited Treatability Testing and High Pressure Injection of Activated Sodium Persulfate to Move Site toward Closure, Again, Association for Environmental Health and Sciences, Abstract, AEHS Proceedings March 15-18, 2010, San Diego, California

Jacobs, J., and Testa, S., 2010, Comparison of Two Metals Treatment Technologies in Soil, Sludges and Water: 1990-2010, Association for Environmental Health and Sciences, Abstract, AEHS Proceedings March 15-18, 2010, San Diego, California

Jacobs, J., and Elam, J., 2010, Improving Water Quality by Reducing Pharmaceutical and Residential Wastes, Managing Resources and Preventing Contamination, Association for Environmental Health and Sciences, Abstract, AEHS Proceedings March 15-18, 2010, San Diego, California

Jacobs, J., and Testa, S., 2010, Postulated Dissolved Oxygen Demand for Aerobic Marine Degradation of Crude Oil from the BP Oil Spill of 2010, Abstract, Proceedings September 11-15, 2010, American Institute of Professional Geologists Annual Meeting, Orlando, Florida

Jacobs, J., and Elam, J., 2009, A Model of Environmental Sustainability for Managing Resources, Minimizing Wastes and Reducing Groundwater Contamination at a California Community Services District, National AIPG Meeting Proceedings; October 3-7, 2009, Grand Junction, Colorado

Jacobs, J. A. and Guertin, J., 2009, Overview of Cleanup Design Options and Treatability Testing for In Situ Remediation of Soil and Groundwater, *The Professional Geologist*, American Institute of Professional Geologists, July/August, V. 46, No. 4, p. 43-50.

Jacobs, J., 2009, Free Product Removal of Diesel-Range Hydrocarbons Using a 3 Step Flushing, Extraction and Infusion Process, Association for Environmental Health and Sciences, Abstract, AEHS Proceedings March 9-12, 2009, San Diego, California

Jacobs, J., and Brewer, R., 2009, Cleanup Planning and Design using Remediation Management Zones: Ozone with Enhanced Bioremediation Case Study, Association for Environmental Health and Sciences, Abstract, AEHS Proceedings March 9-12, 2009, San Diego, California

Jacobs, J., Nelson, L., Begley, J., 2008, Innovative Free Product Removal Advances in Enhanced Flushing Processes for NAPL Recovery, Association for Environmental Health and Sciences, Abstract, AEHS Proceedings March 10-13, 2008, San Diego, California

Jacobs, J., 2008, In-Situ Chemical Oxidation including Ozone/Perozone in the Netherlands Over 5 Years: Review of the SKB Report, Assoc. for Env. Health and Sci., Abstract, AEHS Proceedings March 10-13, 2008, San Diego, California



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Jacobs, J., and Brewer, R., 2008, An Integrated Simultaneous Approach to Groundwater Remediation using Environmental Hazard Evaluation and Remediation Management Zone Maps, American Institute of Professional Geologists, National AIPG Meeting Proceedings, September 20-24, 2008, Flagstaff, Arizona

Jacobs, J., Nelson, L., and Begley, J., 2008, Two Rapid Enhanced Flushing NAPL Recovery Methods, Battelle Conference, Abstracts, Battelle Chlorinated Solvent Meeting Proceedings, May 19-22, 2008, Monterey, California

Jacobs, J., Begley, J., and Murphy, N., 2008, Significant Improvement of In-Situ Gas Mass Transfer Performance for Groundwater Remediation Projects, Battelle Conference, Abstracts, Battelle Remediation of Chlorinated and Recalcitrant Compounds Meeting Proceedings, May 19-22, 2008, Monterey, California

Jacobs, J.A. and McEdwards, D., 2007, Passive In-Situ Oxygen and Nutrient Injection Project in Santa Rosa, California, Association for Environmental Health and Sciences, Abstract, AEHS Proceedings March 19-22, 2007, San Diego, California

Jacobs, J.A. and McEdwards, D., 2007, Gas Infusion Subsurface Recirculation Systems for Enhanced Bioremediation and Abiotic Geochemical Fixation, Association for Environmental Health and Sciences, Abstract, AEHS Proceedings March 19-22, 2007, San Diego, California

Jacobs, J., Nelson, L., and Begley, J., 2007, Rapid NAPL Recovery Using Two Different Enhanced Flushing Processes, National AIPG Meeting Proceedings; October 7-11, 2007, Traverse City, Michigan

Jacobs, J., 2006, Viscous Waste Oil Remediation Using High Vapor Extraction with Biosolvent Flushing, National Ground Water Association, Petroleum Hydrocarbons and Organic Chemicals in Ground Water Meeting Proceedings; November 6-8, 2006, Houston, Texas

Jacobs, J., and McEdwards, D., 2006, A Case Study of Indirect Geochemical Indicators, National Ground Water Association, Petroleum Hydrocarbons and Organic Chemicals in Ground Water Meeting Proceedings; November 6-8, 2006, Houston, Texas

Jacobs, J., and Ryder-Smith, M., 2006, Biosolvent Flushing and High Vacuum Extraction of Heavy Waste Oil, Battelle Conference, Abstract, Battelle Remediation of Chlorinated and Recalcitrant Compounds Meeting Proceedings, May 21-26, 2006, Monterey, California

Jacobs, J., and Ryder-Smith, M., 2006, Hotspot Well Treatment of Petroleum Hydrocarbons for Site Closure, Battelle Conference, Abstract, Battelle Remediation of Chlorinated and Recalcitrant Compounds Meeting Proceedings, May 21-26, 2006, Monterey, California

Jacobs, J., and McEdwards, D., 2006, Update: Passive In-Situ Oxygen and Nutrient Injection Project in Santa Rosa, California, Battelle Conference, Abstract, Battelle Remediation of Chlorinated and Recalcitrant Compounds Meeting Proceedings, May 21-26, 2006, Monterey, California

Jacobs, J., and McEdwards, D., 2004, Chemical Indicators for In-Situ Bioremediation of Petroleum Hydrocarbons, National Ground Water Association, Petroleum Hydrocarbons and Organic Chemicals in Ground Water Meeting Proceedings; December 13-17, 2004, San Francisco, California

Jacobs, J., 2003, Chemical Oxidation and Enhanced Natural Attenuation for Oil Field Remediation, Pacific Section American Association of Petroleum Geologists, Pac Section AAPG Annual Meeting Proceedings, May 19-24, 2003, Long Beach, California

Jacobs, J., and Testa, S.M., 2003, Design Considerations for *In-Situ* Chemical Oxidation Using High Pressure Jetting Technology, AEHS Soil, Sediment and Water, March/April p. 51-60.

Jacobs, J., 2002, Overcoming Limitations of *In-Situ* Remediation using Chemical Oxidizers and Bio-Amendments for Petroleum Hydrocarbons and Chlorinated Solvents, Assoc. of Engineering Geologists and American Institute of Professional Geologists Annual Meeting, Reno, Nevada, abstracts, p. 53.



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Jacobs, J., and Parker, T., 2002, Low Concentrations of Organic Contaminants in the Hydrologic System, Abstracts and presentation, 11th Annual Groundwater Resources Association Meeting and Conference, Long Beach, California, September 18-19, 2002.

Jacobs, J., 2001 Optimization of Existing Soil Vapor Extraction and Pump and Treat Systems using *In-Situ* Hydraulic Fracturing, Groundwater Resources Association of California, 10th Annual Meeting and 23rd Biennial Groundwater Conference, Sacramento, California, October 30, Abstracts, p. 65.

Jacobs, J., 2001, *In-Situ* Delivery Methods for Remediation of Hexavalent Chromium in Soil and Groundwater, National Joint Meeting of the Association of Engineering Geologists and American Institute of Professional Geologists, St. Louis, October 5, St. Louis, Missouri, Abstracts, p. 62.

Jacobs, J., 2001, Insights into Remediation of Recalcitrant Compounds using *In-Situ* Liquid Delivery Systems for Chemical Oxidation, Bioremediation, and Metals Stabilization, Groundwater Resources Association of California, 2nd Symposium in the Series on Groundwater Contaminants: Characterization & Remediation of Emerging and Recalcitrant Contaminants, June 14-15, 2001, Proceedings, 12 p.

Jacobs, J., Kram, M., and Lieberman, S., 2000, Direct Push Technology Sampling, Standard Encyclopedia of Environmental Science and Technology, J. Lehr, ed., McGraw Hill, New York, NY; p. 11.151 – 11.163.

Jacobs, J., and Phillips, J., 2000, Global Positioning Systems (GPS) and Environmental Projects, Standard Encyclopedia of Environmental Science and Technology, J. Lehr, ed., McGraw Hill, New York, NY; p. 11.1 – 11.15.

Jacobs, J., 2000, Monitoring Well Construction and Sampling Techniques, Standard Encyclopedia of Environmental Science and Technology, J. Lehr, ed., McGraw Hill, New York, NY; p. 11.46 – 11.68.

Jacobs, J., 2000, Passive *In-situ* Remediation Systems, Standard Encyclopedia of Environmental Science and Technology, J. Lehr, ed., McGraw Hill, New York, NY; p. 14.12 – 14.25.

Jacobs, J., 2000, Applications of Jetting Technology for *In-situ* Remediation, Association of Engineering Geologists – Groundwater Resources Association 2000 Annual Meeting, San Jose, Abstracts, p. 92.

Jacobs, J., 2000, *In-Situ* Remediation of Hot Spots using Jetting Technology; 52nd Annual National Ground Water Association Meeting, Las Vegas, NV, Program, Abstracts, p. 24.

Jacobs, J., Ruslen, D., MacLeod, S., and Taylor, T., 1999, *In-Situ* High Pressure Remediation Injection Process, Hydrovisions, Fall, 1999, Groundwater Resources Association.

Jacobs, J. and Bertucci, P. ed., 1998, Geology and Hydrogeology of Northern San Francisco Bay Area, Groundwater Resources Association 7th Annual Meeting Field Trip Guidebook, October, 1998.

Jacobs, J., 1998, Private Land Recycling -A New Approach to Brownfields, Hydrovisions, Spring, 1998, Groundwater Resources Association.

Jacobs, J., Baker, S. and Stewart, R., 1998, Implications of Nationwide Policy Changes in Environmental Regulations, American Institute of Professional Geologists, January, 1998 p 6.-8.

Jacobs, J. and von Wedel, R., 1997, Enhanced In Situ Biodegradation Via High Pressure Injection of Oxygenating Agents and Nutrients, American Institute of Professional Geologists, 34th Annual Meeting, Houston, TX, Abstracts, p. 27.

Jacobs, J., 1996, Passive Oxygen Barrier for Groundwater, Hydrovisions, January/February, 1996, Groundwater Resources Association.



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Jacobs, J., 1996, Spotlight on a new technology: January 1996, American Institute of Professional Geologists; Northern California Section Newsletter, p. 1, January, 1996.

Jacobs, J., 1995, Vertical and Horizontal Direct Push Technology and *In-Situ* Remediation Delivery Systems, 1995 Annual Meeting, Groundwater Resources Association, Sacramento, California; October 6, 1995; Abstracts, p. 59.

Jacobs, J., 1994, Overview of Site Evaluation and *In-Situ* Remediation Technologies by Direct Penetration Method,, 1994 Annual Meeting, Groundwater Resources Association, Napa, California; September 29, Abstracts..

Jacobs, J. and Loo, W., 1994, Direct Push Technology-Site Evaluation and Remediation Technologies without the use of Hollow Stem Auger Rigs, American Institute of Prof. Geologists California Section Newsletter, p. 4-6, July, 1994.

Jacobs, J. and Loo, W., 1994, Direct Push Technology Methods for Site Evaluation and *In-Situ* Remediation, *Hydrovisions*, July/August, 1994, Groundwater Resources Association.

Jacobs, J. and Loo, W., 1994, DPT Technology Opens New Remediation Avenues, *ECON Mag.*, p. 36-37, December.

Jacobs, J., 1992, Environmental Assessments of Oil and Gas Fields, American Association of Petroleum Landman 1992 West Coast Symposium, Santa Barbara, Proceedings, 36 p.

Jacobs, J., Traver, R., and Jacobs, O., 1991, Environmental Investigations and Remediations of Oil and Gas Fields, American Association of Petroleum Geologists, Annual Meeting, Dallas, TX, AAPG Bulletin, Abstracts, April; p. 601.

Jacobs, J., and Davis, P., 1990, Environmental Liability and the Oil and Gas Prospector, American Association of Petroleum Geologists, Annual Meeting, San Francisco, CA, AAPG Bulletin, Abstracts, June.

Jacobs, J., 1985, Fluvial Responses to Hydrologic Changes on the Red River in Northeast Texas. In Transactions, pp. 409-414, Austin, Texas: Gulf Coast Association of Geologic Societies, AAPG Bulletin,, October; Abstracts, p. 1424.

Jacobs, J., McCorkick, O., and Gilmore, 1981, Exploration Model for Archeology Sites on the Red River in Northeast Texas, 23rd Annual Meeting of the Caddo Conference, March 13-14, 1981, University of Oklahoma, Abstracts.

Jacobs, J. 1980, Geomorphology of the Red River from Texarkana to Lake Texoma, in Red River Archaeology Project, ed. K. Gilmore and O. McCormick, pp. 70-90. Denton, Texas: Institute of Applied Sciences.

Jacobs, J., 1981, Depositional and Quaternary History of the Red River in Northeast Texas, M.A. Thesis, University of Texas at Austin, 1981.

Kram, M., Lieberman, S., and Jacobs, J., 2000, Direct Sensing Technologies, Standard Encyclopedia of Environmental Science and Technology, J. Lehr, ed., McGraw Hill, New York, NY; p. 11.124 – 11.150.

Nikas, J., and Jacobs, J., 1990, Observations Made in the Marina District of San Francisco After the Northern California Earthquake of 1989, American Association of Petroleum Geologists, Annual Meeting, San Francisco, CA, AAPG Bulletin, Abstracts, June.

Phillips, J.K. and Jacobs, J., 2000, The Impact of Global Positioning Systems on Groundwater Resources, *Hydrovisions*, Fall, 2000, Groundwater Resources Association, Vol. 9, No. 3.

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GRADUATE CLASSES TAUGHT

SRTMU: Risk-Based Subsurface Environmental Management and Sustainable Remediation; School of Earth Sciences, Department of Environmental Science, Swami Ramanand Teerth Marathwada University, Nanded, India. Lecture hours: 42; participants: 45 students; Year: 2012; Co-teachers: Chin Man Mok and Stephen Baker; Projects.

GIS: Analysis and Sustainable Remediation of Environmental Resources; Government Institute of Science, Department of Geology, Government Institute of Science, Aurangabad, India. Lecture hours: 16; participants: 30 students; Year: 2012; Co-teachers: Stephen Baker; Lectures.

TUM: Risk-Based Subsurface Environmental Management, Engineering Department, Technical University of Munich, Munich, Germany. Lecture hours: 30; participants: 18 students; Year: December, 2011; Co-teachers: Chin Man Mok, and Ravi Arulanantham; Exams and Projects.

UCBE: X-451: University of California, Berkeley Extension, Berkeley Campus, California: 7 session graduate class titled Sustainable Remediation of Soil and Groundwater. Lecture hours: 32; participants: 8 students; Year: Fall 2011; Exams and Projects.

UCBE: X-451: University of California, Berkeley Extension, San Francisco Campus, California: 7 session graduate class titled Sustainable Remediation of Soil and Groundwater. Lecture hours: 32; participants: 12 students; Year: Spring 2011; Exams and Projects.

UWI – EM643: University of the West Indies, Mona Campus, Jamaica, Geology Department: 4-week daily graduate class titled Environmental Engineering: Sampling, Assessment and Remediation. The course was a required class for a master's degree in Contaminant Hydrogeology, Environmental Science and Risk Management. Lecture hours: 80; participants: 13 students; Year: March, 2004; Exams and Projects.

UNIVERSITY SHORT COURSES TAUGHT

ACE: Remediation of Contaminated Soils and Groundwater: The California Experience. Engineering Department, Afeka College of Engineering in Tel Aviv, Israel. Lecture hours: 40; participants: 28 students; Year: 2008; Co-teachers: Ravi Arulanantham, Chin Man Mok, and Ami Adini.

UWI: Risked-Based Corrective Action, Risk Assessment, and In-Situ Remediation and Natural Attenuation Processes; Petroleum Corporation of Jamaica and UWI Geology Department, University of the West Indies, Mona Campus (near Kingston, Jamaica). Lecture hours: 24; participants: 35 students; Year: March 2004; Co-teachers: Ravi Arulanantham and Roger Brewer.

UWI: Environmental Sampling and Remediation Workshop; Geology Department, University of the West Indies, Mona Campus (near Kingston, Jamaica). Lecture hours: 8; participants: 15 students; Year: February 2003.

PROFESSIONAL WORKSHOPS TAUGHT

2010, “In-Well Stripping/Recirculation and Two-Phase Extraction Methods, Application and Enhancement for Groundwater and Soil Remediation” A four hour Short Course presentation, 20th International Conference on Soils, Sediments, Water, and Energy and AEHS Foundation Annual Meeting 2010, San Diego, California, March 15-18, 2010; Co-teachers: Mehmet Pehlivan and Philip G. Mihopoulos,



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2009, "Risky Based Corrective Action (RBCA) Grows Up: Introduction to Environmental Hazard Evaluation and Advanced Approaches for Site Investigations." A four hour Short Course presentation, Association for Environmental Health and Sciences, 2009, National Meeting, San Diego, California, Co-teachers: Roger Brewer, and Jason Brodersen.

2009, "Two-Phase Extraction Methods, Application for Groundwater and Soil Remediation" A four hour Short Course presentation, American Institute of Professional Geologists, 2009 National Meeting, Grand Junction, Colorado; Co-teachers: Mehmet Pehlivan.

2008, "Two-Phase Extraction Methods, Application for Groundwater and Soil Remediation" A four hour Short Course presentation, The 6th International Conference, Remediation of Chlorinated and Recalcitrant Compound, Monterey, California, May 19-22, 2008. Organized by Battelle, Columbus, Ohio; Co-teachers: Mehmet Pehlivan.