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JAMES A. JACOBS
P.G., C.H.G., C.P.G., C.Pet.G., ToR QISP, ToR QSD/QSP
 Principal Geologist

Education

M.A. Geology, University of Texas, Austin, Texas
 B.A. Geology, English, Franklin and Marshall College, Lancaster, Pennsylvania

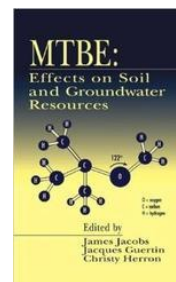
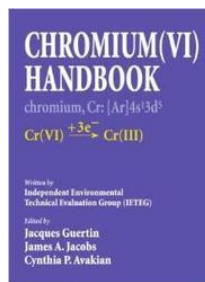
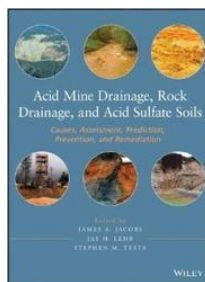
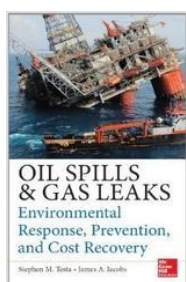
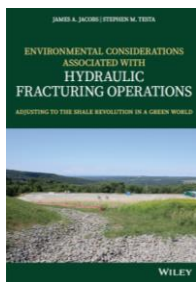


James Jacobs has more than thirty-five years of experience as a geologist. He is a certified hydrogeologist, professional geologist, licensed well driller and general engineering contractor. His most recent work includes forensic analysis related to subsurface events, including pipe breaks, contaminant spills, oil and gas resource valuation estimates, and groundwater contamination. He has worked on a variety of producing and redeveloped oil field properties, 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 he has performed more than 1,000 projects.

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 and member 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).

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

He has developed, edited and co-authored five technical books related to the unintended consequences of large-scale industrial processes, most notably, *MTBE: Effects on Soil and Groundwater Resources* (CRC Press, 2001), *Chromium [Cr(VI)] Handbook* (CRC Press, 2004), *Oil Spills and Gas Leaks: Environmental Response, Prevention, and Cost Recovery* (McGraw-Hill, 2014), *Acid Mine Drainage* (Wiley, 2014) and *Environmental Considerations Associated with Hydraulic Fracturing Operations: Adjusting to the Shale Revolution in a Green World* (Wiley, in press). He has written over 100 articles and given over 50 technical presentations.



Subject Matter Expert

He has been involved as a hydrogeologist and water expert witness on hundreds of legal cases, testifying 17 times in 15 cases over the past since 1991. He is a Fellow at the National Ground Water Association (NGWA) and has been a member since 1989. In 2016, he was named a Virtual Fellow at the U.S. State Department for his work on Cabo Verde and Energy Sustainability. He has explained complex water issues as part of a legislative team of professional geologists to California legislators and in Washington, D.C. during legislative meeting days. He has been selected and served on various state board panels as a subject matter expert.



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Peer Review

Mr. Jacobs serves in a peer review capacity for several organizations.

- Fulbright Program - He served from 2006 to 2011 on the Fulbright Peer Review Committee, screening candidates in the Fulbright Senior Specialists Program in geology and environmental science.
- AIPG - 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.
- AEHS - Since 2005, he has been on the Science Advisory Board for the Association for the Environment, 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.
- UC/CalEPA - In October 2011, Jacobs performed a peer review for the University of California Regents under contract to CalEPA 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;
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: Fellow: National Ground Water Association

Professional Awards

1998: Groundwater Resources Association; President's Tribute Certificate
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
2011: American Institute of Professional Geologists: Honorary Membership Award
2015: American Institute of Professional Geologists: Martin Van Couvering Memorial Award

Committee and Board Appointments

2005–present: Science Advisory Board, Association for the Environment, Health and Sciences
2007–2011: Selected and Served on Fulbright Senior Specialists Peer Review Committee; CIES
2014 – present: ASTM International (American Society of Testing Materials); D-18 and E50 Committee Member
2017 – present: Interstate Technical & Regulatory Council (ITRC): Methane Detection Committee Member

Publicly Elected Positions

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

Certifications and Licenses

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
Certified Petroleum Geologist, American Association of Petroleum Geologists, #6231
Registered Environmental Assessor I: California # 1511; REA II: #20171 (program discontinued).



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Registered Asbestos Inspector: AHERA Accredited; OLA Registration # 0000450
California Qualified Stormwater Pollution Prevention Plan Developer (QSD) and Preparer (QSP); Certificate #21430
QSD/QSP California General Permit (CGP) Trainer of Record (ToR); August 2016
California Qualified Industrial Stormwater Pollution Practitioner (QISP); Certificate #00617; March 2017
QISP California Industrial Permit (CIP) Trainer of Record (ToR); May 2017
CSLB License #624461: Driller (C-57), General Engineering, Hazardous Materials Removal, Asbestos Abatement
California Commercial Driver License: C with Hazmat Endorsement

Professional History

1990- present; Principal Geologist; The Auger Group, Inc., dba Clearwater Group, Pt. Richmond, California
2002-present; Geologist; Environmental Bio-Systems, Mill Valley, California
1989-1990 Project Geologist, Harding & Lawson Associates (now Wood Group), Novato, California
1986-1989 Senior Oil Geologist, Petrofina Delaware (now Total, S.A.), Houston, Texas
1981-1985 Exploration Oil Geologist, SOHIO Petroleum (now BP), San Francisco, California and Anchorage, Alaska
1979-1981 Institute of Applied Sciences, North Texas State University, Denton, Texas
1975-1978 Technician, U.S. Bureau of Mines, Coal Research Station, Bruceton, Pennsylvania

Professional Associations

American Association of Petroleum Geologists (AAPG): Active Member 1979 to present; Div. Environmental Geosciences (July 2012); CPetG (Feb 2014)
American Institute of Professional Geologists (AIPG); Elected National AIPG Advisory Board: 2000; Elected National AIPG Vice President; 2013; State President or Vice President: 1996 to present. Sponsor of AIPG Student Chapters: UC Davis 2010-present, Sonoma State University: 2016 to present
American Society for Testing and Materials (ASTM International), 2014 to present, Committee D18 on Soil and Rock; Committee E50 on Environmental Assessment, Risk management and Corrective Action
Assoc. for the Environment, Health and Sciences (AEHS); 2002 to present; Science Advisory Group (2005 to present)
California Council of Geoscience Organizations (CCGO): President 2000 to present
California Stormwater Quality Association (CASQA): 2016 to present
CORE Environmental Foundation (non-profit): Co-founder and President 2009-2011
ECON Magazine - Editorial Advisory Board, 1994 to 1996
Forensic Expert Witness Association; Member (FEWA); 2014 to present
Fulbright Association – Lifetime Member, 2014 to present
Groundwater Resources Association of California (GRAC), Director, GRAC 1999 – 2004; Treasurer 1999, 2002
GRAC SF Branch: President: 1996-1998; 2009-2010; Vice President: 1995, Field Trip Coordinator: 1998, Technical Chairman: 1994
Interstate Technology and Regulatory Council (ITRC); 2017 to present; Methane Detection; Stormwater BMPs
National Ground Water Association (NGWA); Member 1989 to present

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. Jacobs has participated in co-teaching continuing education workshops for AEHS, AIPG, GRAC, and CUPA.

Publications - Technical Books

Books co-authored by James Jacobs (ordered by most recent):

Jacobs, J. and Testa, S., (In Press; 2019) Environmental Considerations Associated with Hydraulic Fracturing Operations: Adjusting to the Shale Revolution in a Green World, John Wiley, & Sons, Inc., Hoboken, NJ; 592 p.

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.



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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.

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

Peer-Reviewed Articles

Wagh, V.M., Panaskar, D.B., Jacobs, J.A., Mukate, S.V., Muley, A.A., and Kadam, A.K., 2019, Influence of hydro-geochemical processes on groundwater quality through geostatistical techniques in Kadava River basin, Western India, *Arabian Journal of Geosciences*, Springer Berlin Heidelberg, January, V. 12, Issue 1, 25 pp.,

Mukate, S.V., Wagh, V., Panaskar, D., Jacobs, J.A., and Sawant, A., 2019, Development of new integrated water quality index (IWQI) model to evaluate the drinking suitability of water, *Ecological Indicators*, Elsevier, Amsterdam, Netherlands, V. 101, June, p. 348-354.

Interstate Technology and Regulatory Council (ITRC), 2018, Evaluation of Innovative Methane Detection Technologies, ITRC.org; Methane-1, co-author with more than a dozen state regulatory representatives.

Roghani, M., Jacobs, O.P., Miller, A., Willett, E.J., Jacobs, J.A., 2018, Occurrence of Chlorinated Volatile Organic Compounds (VOCs) in a Sanitary Sewer System: Implications for Assessing Vapor Intrusion Alternative Pathways, *Science of the Total Environment*, March, 616-617, p. 1149-1162.

Jacobs, J.A., Jacobs, O.P., and Pennell, K.G., 2017, One Alternative Exposure Pathway of Volatile Organic Compound (VOC) Vapors from Contaminated Subsurface Environments into Indoor Air – Legacy Sewer-Plumbing Systems, *The Professional Geologist*, Reprint and Update of GRAC *Hydrovisions* Article, V. 54, N. 3, July-Aug-Sept., p. 28 – 32.

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, 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.

Selected 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.



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- 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., 2017, Acidic Drainage from Newly Deglaciaded Areas with Sulfide-Rich Surficial Rocks- Possible Mitigation Measures, *in* Technological Advances in Climate-Smart Agriculture and Sustainability (TACSAS), Proceedings of International Conference on TACSAS-2017, SRTM University, Nanded, India, ed. Waikar, M.L. et. al., Excel India Publishers, New Delhi, India, p. 436-440.
- 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, Groundwater Resources Association of California, *Hydrovisions*, Spring 2015, p. 20-24.
- Jacobs, J.A. and Geddes-McDonald, L., 2005, Groundwater and Nitrate: Chemical Behavior and Treatment, Wiley Water Encyclopedia, Wiley, Hoboken, N.J.
- Jacobs, J., and Testa, S.M., 2003, Design Considerations for *In-Situ* Chemical Oxidation Using High Pressure Jetting Technology, Association for the Environment, Health and Sciences, *AEHS Soil, Sediment and Water*, March/April p. 51-60.
- 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., Ruslen, D., MacLeod, S., and Taylor, T., 1999, *In-Situ* High Pressure Remediation Injection Process, *Hydrovisions*, Fall, 1999, Groundwater Resources Association of California.
- Jacobs, J. and Bertucci, P. ed., 1998, Geology and Hydrogeology of Northern San Francisco Bay Area, Groundwater Resources Association of California 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 of California.
- 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., 1996, Passive Oxygen Barrier for Groundwater, *Hydrovisions*, January/February, 1996, Groundwater Resources Association of California.
- 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. 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.



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

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

Jacobs, J., 1985, Fluvial Responses to Hydrologic Changes on the Red River in Northeast Texas; *Transactions of the Gulf Coast Association of Geologic Societies*, Austin, Texas, pp. 409-414.

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

Jacobs, J., McCormick, 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.

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.

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

Testa, S.M., and Jacobs, J.A., 2002, The Remediation of Hazardous Wastes from Oil Well Drilling, *Handbook of Complex Environmental Remediation Problems*, McGraw-Hill Handbooks Series, J. Lehr, ed., John Wiley & Sons, New York, NY; Chpt. 8, p. 8.1-8.56.

Testa, S.M., and Jacobs, J.A., 2002, Oil Spills and Leaks, *Handbook of Complex Environmental Remediation Problems*, eds. Lehr, J., Hyman, M., Gass, T.E., and SeEVERS, W.J., McGraw-Hill Handbooks, New York, NY; Chpt. 9, p. 9.1-9.85.

Testa, S.M., and Jacobs, J.A., 2000, Geological Principles, *Standard Encyclopedia of Environmental Science and Technology*, J. Lehr, ed., McGraw Hill, New York, NY, Chapter 3; p. 3.1 – 3.30.

Abstracts and Presentations

Jacobs, J.A., 2018, Diverse Settings for Natural and Anthropogenic Pyrite Oxidation and Selected Mitigation Strategies; *Proceedings of the 28th Annual International Conference, Association for the Environment, Health and Sciences*, San Diego, California, March 19-22, Abstracts, p. 51.

Jacobs, O.P., and Jacobs, J.A., O'Neill, H., and Schneider, R., 2018, Unintentional Discharges of Industrial Compounds into and out of Sanitary or Stormwater Drainage Systems in Urban Settings; *Proceedings of the 28th Annual International Conference, Association for the Environment, Health and Sciences*, San Diego, California, March 19-22, Abstracts, p. 86.

Jacobs, J.A., and Jacobs, O.P., 2017, What Geologists Know about Sewer Systems that Plumbers Don't: Vapor Intrusion into Indoor Air and the Sewer-Plumbing System; *Proceedings of the 54th Annual American Institute of Professional Geologists National Meeting*, Nashville, Tennessee, September 23-26, Abstracts.

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; *Proceedings of the 26th Annual International Conference, Association for the Environment, Health and Sciences*, San Diego, California, March 21-24, 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; *Proceedings of the 52nd Annual American Institute of Professional Geologists National Meeting*, Anchorage, Alaska, September 19-22, Abstracts, p. 38-39.



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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; Proceedings of the 25th Annual International Conference, Association for the Environment, Health and Sciences, San Diego, California, March 23-26, Abstracts, p. 93.

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; Proceedings of the 51st Annual American Institute of Professional Geologists National Meeting, Prescott, AZ, September 13-16, Abstracts, p. 73-74.

Jacobs, J.A., and Testa, S.M., 2014, Comprehensive Rethinking of Wastes from Mine Sites into Resources; Proceedings of the 24th Annual International Conference, Association for the Environment, Health and Sciences Foundation, March 17-20, San Diego, California, Abstracts.

Jacobs, J.A., 2014, Recent Trends and Prevention for a Significant Occupational Hazard for Scientists and Engineers and Other Field Workers: *Coccidioidomycosis*: (Valley Fever); Proceedings of the 24th Annual International Conference, Association for the Environment, Health and Sciences, March 17-20, San Diego, California, Abstracts.

Jacobs, J.A., and Testa, S.M., 2013, The Geologist's Role in Comprehensive Rethinking of Wastes from Mine Sites into Resources; Proceedings of the 50th Annual American Institute of Professional Geologists Meeting, October 24-25, Broomfield, Colorado, Abstracts.

Jacobs, J.A., 2013, Recent Trends and Prevention for a Significant Occupational Hazard for Scientists and Engineers and Other Field Workers: *Coccidioidomycosis*: (Valley Fever); Proceedings of the 50th Annual American Institute of Professional Geologists Meeting, October 24-25, Broomfield, Colorado, Abstracts.

Jacobs, J.A., and Testa, S.M., 2012, Sustainable Remediation and Green Resource Extraction Practices of Acid Mine Drainage Sites; Proceedings of the Sierra Fund, Reclaiming the Sierra: Green Solutions to Abandoned Mines, May 3-5, Abstracts, p. 11.

Jacobs, J.A., and Testa, S.M., 2011, Two Metals Treatments for Soil, Sludges and Water using Green Remediation Criteria; Proceedings of the 48th Annual American Institute of Professional Geologists Meeting, September 10-14, Bloomfield, Illinois, Abstracts.

Jacobs, J.A., Archibald, J., and Drury, D., 2011, Sustainable Water Treatment Practices for Blue Green Algae Blooms to Restore Lakes and Reservoirs; Proceedings of the 48th Annual American Institute of Professional Geologists Meeting, September 10-14, Bloomfield, Illinois, Abstracts.

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; Proceedings of the 20th Annual International Conference, Association for the Environment, Health and Sciences, March 15-18, San Diego, California, Abstracts.

Jacobs, J., and Testa, S., 2010, Comparison of Two Metals Treatment Technologies in Soil, Sludges and Water: 1990-2010; Proceedings of the 20th Annual International Conference, Association for the Environment, Health and Sciences, March 17-20, San Diego, California, Abstracts.

Jacobs, J., and Elam, J., 2010, Improving Water Quality by Reducing Pharmaceutical and Residential Wastes, Managing Resources and Preventing Contamination; Proceedings of the 20th Annual International Conference, Association for the Environment, Health and Sciences, March 17-20, San Diego, California, Abstracts.

Jacobs, J., and Testa, S., 2010, Postulated Dissolved Oxygen Demand for Aerobic Marine Degradation of Crude Oil from the BP Oil Spill of 2010, Proceedings of the 47th Annual National American Institute of Professional Geologists Meeting, September 11-15, Orlando, Florida, Abstracts.



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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; Proceedings of the 46th Annual National American Institute of Professional Geologists Meeting, October 3-7, Grand Junction, Colorado, Abstracts.

Jacobs, J., 2009, Free Product Removal of Diesel-Range Hydrocarbons Using a 3 Step Flushing, Extraction and Infusion Process; Proceedings of the 19th Annual International Conference, Association for the Environment, Health and Sciences, March 9-12, San Diego, California, Abstracts.

Jacobs, J., and Brewer, R., 2009, Cleanup Planning and Design using Remediation Management Zones: Ozone with Enhanced Bioremediation Case Study; Proceedings of the 19th Annual International Conference, Association for the Environment, Health and Sciences, March 9-12, San Diego, California, Abstracts.

Jacobs, J., Nelson, L., Begley, J., 2008, Innovative Free Product Removal Advances in Enhanced Flushing Processes for NAPL Recovery, Proceedings of the 18th Annual International Conference, Association for the Environment Health and Sciences, March 10-13, San Diego, California, Abstracts.

Jacobs, J., 2008, In-Situ Chemical Oxidation including Ozone/Perozone in the Netherlands Over 5 Years: Review of the SKB Report; Proceedings of the 18th Annual International Conference, Association for the Environment Health and Sciences, March 10-13, San Diego, California, Abstracts.

Jacobs, J., and Brewer, R., 2008, An Integrated Simultaneous Approach to Groundwater Remediation using Environmental Hazard Evaluation and Remediation Management Zone Maps; Proceedings from the 45th Annual National American Institute of Professional Geologists Meeting, September 20-24, Flagstaff, Arizona, Abstracts.

Jacobs, J., Nelson, L., and Begley, J., 2008, Two Rapid Enhanced Flushing NAPL Recovery Methods; Proceedings of the 6th International Conference on the Remediation of Chlorinated and Recalcitrant Compounds, Battelle Conference, May 19-22, Monterey, California, Abstracts.

Jacobs, J., Begley, J., and Murphy, N., 2008, Significant Improvement of In-Situ Gas Mass Transfer Performance for Groundwater Remediation Projects; Proceedings of the 6th International Conference on the Remediation of Chlorinated and Recalcitrant Compounds, Battelle Conference, May 19-22, Monterey, California, Abstracts.

Jacobs, J.A. and McEdwards, D., 2007, Passive In-Situ Oxygen and Nutrient Injection Project in Santa Rosa, California; Proceedings of the 17th Annual International Conference, Association for the Environment Health and Sciences, March 19-22, San Diego, California, Abstracts.

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Jacobs, J., Nelson, L., and Begley, J., 2007, Rapid NAPL Recovery Using Two Different Enhanced Flushing Processes; Proceedings of the 47th Annual National AIPG Meeting, October 7-11, Traverse City, Michigan, Abstracts.

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

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

Jacobs, J., and Ryder-Smith, M., 2006, Biosolvent Flushing and High Vacuum Extraction of Heavy Waste Oil; Proceedings of the 5th International Conference on the Remediation of Chlorinated and Recalcitrant Compounds, Battelle Conference, May 21-26, Monterey, California, Abstracts.



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Jacobs, J., and Ryder-Smith, M., 2006, Hotspot Well Treatment of Petroleum Hydrocarbons for Site Closure; Proceedings of the 5th International Conference on the Remediation of Chlorinated and Recalcitrant Compounds, Battelle Conference, May 21-26, Monterey, California, Abstracts.

Jacobs, J., and McEdwards, D., 2006, Update: Passive In-Situ Oxygen and Nutrient Injection Project in Santa Rosa, California; Proceedings of the 5th International Conference on the Remediation of Chlorinated and Recalcitrant Compounds, Battelle Conference, May 21-26, Monterey, California, Abstracts.

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

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

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

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

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

Jacobs, J., 2001, *In-Situ* Delivery Methods for Remediation of Hexavalent Chromium in Soil and Groundwater, Proceedings of the 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; Proceedings of the 2nd Symposium in the Series on Groundwater Contaminants: Characterization & Remediation of Emerging and Recalcitrant Contaminants, Groundwater Resources Association of California, June 14-15, Abstracts, 12 p.

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

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

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

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

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



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

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

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

Jacobs, J., 1985, Fluvial Responses to Hydrologic Changes on the Red River in Northeast Texas; Proceedings of the Gulf Coast Association of Geologic Societies, AAPG Bulletin, Austin, Texas, October; Abstracts, p. 1424.

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

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

Popkin, B., and Jacobs, J., 2007, When Inaction or Limited Action is the Best Action for Hazwaste Site Cleanups-MONA; Proceedings of the National Academy of Certified Hazardous Materials Managers Meeting, August 12-15, Arlington, Virginia, Abstracts.

von Wedel, R., and Jacobs, J., 2000, Overview of Aerobic Bioremediation and Future Development Potential; Proceedings of the 2000 Annual Association of Engineering Geologists-Groundwater Resources Association of California Meeting, San Jose, Abstracts, p. 118.

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: Sustainable Remediation of Soil and Groundwater. Lecture hrs: 32; 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



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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.

Invited Professional Workshops Taught

2018, Jacobs, J., Jacobs, O., Beckley, L., and McHugh, T., "Sewer VI: Research, Findings and Practical Implactions," M-F4 Sewer Vapor Intrusion Workshop, 20th Annual California Unified Program (CUPA) Training Conference, Burlingame, California, February 5, 2018, Abstracts.

2017, Jacobs, O.P., and Jacobs, J.A., "Dispersal of VOCs; Sewer Air – Sampling Sewer Air – When, Where, How, and Mitigation of VOC-laden Sewer Air," Groundwater Resources Association's Assessment and Remediation of Dry Cleaner Sites Symposium, Concord, California, November 2, 1027, Abstracts.

2017, Jacobs, J.A., and Jacobs, O.P., "Sewer Exfiltration Allowances by Design and Failure," Groundwater Resources Association's Assessment and Remediation of Dry Cleaner Sites Symposium, Concord, California, November 2, 1027, Abstracts.

2016, 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) Training Conference, Anaheim, California, February 24, Abstracts.

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, San Diego, California, March 15-18; Co-teachers: Mehmet Pehlivan and Philip G. Mihopoulos,

2009, "Risked 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 the Environment, Health and Sciences, 2009, International Conference, 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, Battelle, Columbus, Ohio, Co-teachers: Mehmet Pehlivan.



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Post Graduate and Professional Courses Completed

Environmental Science

Environmental Forensics: Applications and Advances in Fingerprinting Techniques to Evaluate Who Was Responsible for a Spill or Release of Organic Contaminants into the Environment, P. Philp, AEHS, Mission Valley, San Diego, California, March 20, 2018.

Classic and Emerging Environmental Forensics Techniques and Applications, I. Petrisor, H. Costa, M.J. Wade., J.C. Balouet, and J.L. Caufield, AEHS, Mission Valley, San Diego, California, March 23, 2015.

Ecological Risk Assessment for a Sustainable Environment, University of Massachusetts, 2010

Assessment Design/Professional Experience Panel, University of California, Berkeley Extension, 2010

Estimating Times of Remediation Associated with Monitored Natural Attenuation and Contaminant Source Removal, F. Chappelle and M. Woddowson, AIPG Annual Meeting, Saratoga, NY, October 4, 2004.

GRA Series on Groundwater Contaminants; Investigation and Remediation of Dry Cleaner Release Sites; Sacramento, California, April, 2004.

GRA Series on Groundwater Contaminants; Characterization and Remediation of Recalcitrant and Emerging Contaminants, San Jose, California, June 2002.

GRA Series on Groundwater Contaminants; Hexavalent Chromium in Groundwater, Glendale, California, January 2001.

EPA Presentations: Advances in Innovative Groundwater Remediation Technologies, San Francisco, California, May 1998

GRA: Surface Geophysical Methods, Oakland, California, November 1997

GRA: Phytoremediation Workshop; J. Lehr, Belmont, California, May 1997

RBCA - Risk and Decision Making at Sites; University of California, Riverside Extension, Santa Clara, California, April, 1996

Contaminant Transport in Groundwater; University of California, Berkeley Extension, Berkeley, California, September to December 1994

EPA West Coast Remediation Marketplace and Innovative Technologies: San Francisco, California, November 1994

EPA Symposium on Bioremediation of Hazardous Wastes: Research, Development and Field Evaluations, San Francisco, California, June 1994

Applied Environmental Statistics, Groundwater Resources Association, Concord, California, May, 1994

Applied Bioremediation Technologies, Hazmacon, San Jose, March, 1994

Intro, Contaminant Transport in Groundwater, University of California, Berkeley Extension, Berkeley, California, T. Buscheck, 1994

Groundwater and Soil Remediation: Design, Safety and Permitting, University of California, Berkeley Extension, Berkeley, California, T. Buscheck, 1993

Bioremediation of Hazardous Waste Sites: EPA Technology Transfer, San Francisco, California, 1993

Management Planning for Asbestos, University of California, Berkeley Extension, Berkeley, California, Fall, 1992

RCRA Corrective Action Stabilization Technologies, EPA Technology Transfer, San Francisco, California, 1992

Site Characterization and Remediation; EPA Technology Transfer, San Francisco, 1990

Physical/Chemical Treatment of Hazardous Waste, EPA Technology Transfer, San Francisco, California, 1990

Federal Environmental Regulations, Rice University, Houston, J. Blackburn, 1989

Building Inspection for Asbestos, University of California, Berkeley, 1989

Fundamentals of Groundwater Hydrology, University of California, Berkeley Extension, G. Aguiar, 1985

Groundwater Contamination, University of California, Davis, F. McLaren, 1985

Petroleum Economics

Economics Basics, SOHIO Petroleum Co., T. Gazulus, April 6, 1984

Advanced Economics Seminar, SOHIO Petroleum Co., J. Campbell, Oct 30 – November 1, 1984

Economic Evaluation of Petroleum Exploration and Development Projects, IHRDC, N.W. Miller, April 11-15, 1988

Petrophysical and Geophysical Tools

Petroleum Overview Class; SOHIO Petroleum Co., Various Instructors, October 19-23, 1981

Log Interpretation #1; Schlumberger, F. Bettis, October 1-4, 1981

Log Interpretation #2; Schlumberger, F. Bettis, November 3-4, 1981

Well Logging, Gearhart, Various Instructors, December 15-20, 1982

Geophysics for Geologists, Geoquest, N. Neidell, July 12-16, 1982

Drilling Practices, Preston Moore, P. Moore, Sept 13-24, 1982

Seismic Stratigraphy, AAPG, L.F. Brown and R. Buffler, December 12-18, 1983

Seismic Interpretation, Colorado School of Mines, T. Davis, March 5-9, 1984



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Advanced Geology and Oil Prospecting

Petroleum Geochemistry; Oil and Gas Consultants, C. Barker, May 17-21, 1982
Modern Clastic Depositional Environments, AAPG/RPI, M. Hayes and W.J. Sexton, April 6-12, 1982
Core Evaluation, Core Laboratories, Various Instructors, December 5, 1982
Structural Geology, AAPG, W.A. Brown, June 6-14, 1983
Ancient Terrigenous Clastics, Colorado School of Mines, R. Weimer, August 27-31, 1984
Sedimentary Basins, Tecton, J. Dewey and W. Pitman, April 23-25, 1985
Turbidites in Sedimentation, Northern California Geological Society, T. Nilsen, May 3-4, 1985
Modern Carbonate Environments, University of Miami, R. Ginsberg, July 8-15, 1985
Northern California Field Seminar, Crouch & Bachman, J. Crouch and S. Bachman, 1986
Creativity in Exploration; J. Elam, Houston, TX, April 16, 1986

Other Training

General Manager Evaluations, California Special District Association (CSDA), February 8, 2017
Required Ethics AB1234 (Brown Act) Compliance Training (CSDA), March 14, 2019
Sexual Harassment Prevention Training 2019 (CSDA), March 13, 2019
Advanced Technical Writing, SOHIO Petroleum Co., C. Cheney, June 5-7, 1984
Making Professional Presentations, Checkpoint Productions, C. Cheney, May 10-12, 1983
Effective Technical Writing, Checkpoint Productions, C. Cheney, October 25-27, 1982
Innovative Problem Solving, Synectics, J. Prince, October 9-11, 1984