

Kirk O'Reilly, Ph.D., J.D.
Managing Scientist

Professional Profile

Dr. Kirk O'Reilly is a Managing Scientist in Exponent's Environmental Sciences practice and is based in Bellevue, Washington. He has more than 25 years of experience investigating the interaction between environmental and biological chemistry, and spent 15 years as an in-house consultant for a major oil company. He is a recognized expert in environmental chemistry, petroleum source identification, and bioremediation, and has played a significant role in developing the oil industry's technical response to managing MTBE in the environment. Dr. O'Reilly was a founding member of Chevron's Oil Spill Environmental Functional Team and is trained in aspects of spill management, response, monitoring, and remediation. He has responded to spills of both crude oil and refined products, and served as on-site liaison to environmental regulators. Dr. O'Reilly has provided litigation support in toxic tort and property damage suits, and managed projects focused on the remediation of soils, sediments, and groundwater, as well as on improving industrial wastewater treatment. Specific contaminants studied include crude oil, refined products, chlorinated solvents, wood treatment compounds, pesticides, and fertilizers. He developed innovative methods for monitoring the transformation and assessing the risk of petroleum. He has also conducted toxicity identification evaluations on refinery effluents and managed waste and water issues on offshore platforms. Experienced working within the constraints of the RCRA, CERCLA, and NPDES programs, Dr. O'Reilly promotes the use of strategic site assessments to reduce costs while improving quality. He has participated in collaborative research projects with regulators at the federal, state, and local levels, and taught technical courses sponsored by regulatory agencies, universities, and industrial trade groups. Dr. O'Reilly is a member of the Washington State Bar.

Academic Credentials and Professional Honors

J.D., University of Idaho College of Law (*magna cum laude*), 2007
Ph.D., Biochemistry, University of Idaho, 1989
M.S., Biology, Portland State University, 1985
B.S., Biology, University of California, Irvine, 1980

Licenses and Certifications

Washington State Bar, #39473

Patents

Patent 6,924,404: Inhibition of Biological Degradation of Fischer-Tropsch Products, 2005 (with M. Moir, and D. O’Rear).

Patent 6,849,664: Process for Disposing Biocidecontaining Cooling Water, 2005 (with M. Moir, D. O’Rear, and R. Moore).

Patent 6,800,101: Deactivatable Biocides for hydrocarbonaceous Products, 2004 (with M. Moir and D. O’Rear).

Patent 6,626,122: Deactivatable biocides in Ballast Water, 2003 (with M. Moir, D. O’Rear, M. Buetzow, M. Dorsch, and V. Brian).

Patent 6,569,909: Inhibition of Biological Degradation in Fischer-Tropsch products, 2003 (with M. Moir, and D. O’Rear).

Patent 5,236,594: Process for removing toxicants from aqueous petroleum waste streams, 1993 (with J. Suzuki).

Publications

O’Reilly KT, Pietari J, Boehm P. Comment on “PAHs Underfoot: Contaminated Dust from Coal-Tar Sealcoated Pavement is Widespread in the U.S.” *Environmental Science and Technology* 2011; 45(7):3185–3186.

O’Reilly KT, Thorsen W. Impact of crude oil weathering on the calculated effective solubility of aromatic compounds: Evaluation of soils from Ecuadorian oil fields. *Soil and Sediment Contamination* 2010; 19:391–404.

O’Reilly KT. Restatement of § 433A and the chemistry of divisibility. *ABA Superfund and NRD Litigation Committee Newsletter* 2010; 5(1):19–22.

O’Reilly KT, Pietari J, Boehm P. A review of PAHs: Polycyclic aromatic hydrocarbons in stormwater and urban sediments. *Stormwater* 2010 Sept.

Chunn Lindsay J, O’Reilly K, Kaetzel R, Roberts M. Limitations of toxicogenomic studies to assess toxic exposures and injury from benzene. *ABA Toxic Torts and Environmental Newsletter*, Fall 2009.

O’Reilly K. Science, policy, and politics: The impact of the Information Quality Act on risk-based regulatory activity at the EPA. *Buffalo Environmental Law Journal* 2007; 14:249–288.

Johnson EL, Smith CA, O’Reilly KT, Hyman MR. Induction of methyl *tertiary* butyl ether (MTBE)-oxidizing activity in *Mycobacterium vaccae* JOB5 by MTBE during cell growth on diverse substrates. *Applied Environmental Microbiology* 2004; 70:1023–1030.

Smith CA, O'Reilly KT, Hyman MR. Cometabolism of methyl *tertiary* butyl ether (MTBE) and gaseous n-alkanes by *Pseudomonas mendocina* KR-1 grown on C5-C8 n-alkanes. *Applied Environmental Microbiology* 2003; 69:7385–7394.

Smith C, O'Reilly K, Hyman M. Characterization of the initial reactions during the cometabolic oxidation of methyl tertiary butyl ether (MTBE) by propane-grown *Mycobacterium vaccae* JOB5. *Applied Environmental Microbiology* 2003; 69:796–804.

Ruiz-Aguilar GM, O'Reilly K, Alvarez PJ. A comparison of benzene and toluene plume lengths for sites contaminated with regular vs. ethanol-amended gasoline. *Ground Water Monitoring and Remediation* 2003; 23:48–53.

O'Reilly K, Moir M, Taylor C, Smith C, Hyman M. Hydrolysis of *tert*-butyl methyl ether (MTBE) in dilute aqueous acids. *Environmental Science and Technology* 2001; 35:3954–3961.

Schroth M, Istok J, Conner G, Hyman M, Haggerty R O'Reilly K. Spatial variability in in-situ aerobic respiration and denitrification rates in a petroleum contaminated aquifer. *Ground Water* 1998; 36(6):924–937.

Donaldson J, Istok J, O'Reilly K. Dissolved gas transport in the presence of a trapped gas phase: Experimental evaluation of a two-dimensional kinetic model. *Ground Water* 1998; 36(1):133–142.

Istok J, Humphrey J, Schroth M, Hyman M, O'Reilly K. Single well, “push-pull” tests for in-situ determination of microbial metabolic activity. *Ground Water* 1997; 35(4):619–631.

Donaldson J, Istok J, Humphrey M, O'Reilly K, Hawelka C, Mohr D. Development and laboratory testing of a kinetic model for dissolved oxygen partitioning and transport in porous media in the presence of trapped gas. *Ground Water* 1997; 35(2):270–279.

Fry V, Istok J, O'Reilly K. Effect of trapped gas on dissolved oxygen transport—Implications for *in situ* bioremediation. *Ground Water* 1996; 34(2):200–210.

Fry V, Istok J, Sempini L, O'Reilly K, Buscheck T. Retardation of dissolved oxygen due to a trapped gas phase in a porous media. *Ground Water* 1995; 33(3):391–399.

O'Reilly K, Crawford R. Degradation of pentachlorophenol by polyurethane-immobilized *Flavobacterium* cells. *Applied Environmental Microbiology* 1989; 55:2113–2118.

O'Reilly K, Crawford R. Kinetics of p-Cresol degradation by an immobilized-*Pseudomonas* sp. *Applied Environmental Microbiology* 1989; 55:866–870.

O'Reilly K, Kadakia R, Korus R, Crawford R. Utilization of immobilized bacteria to degrade aromatic compounds common to wood treatment wastewater. *Water Science and Technology* 1988; 29:95–100.

Rueter R, O'Reilly K, Petersen R. Indirect aluminum toxicity to the green alga *Scenedesmus* through increased cupric ion activity. *Environmental Science and Technology* 1987; 21(5):435–438.

Book Chapters

O'Reilly K, Magaw R. Hydrocarbon transport from oil and soil to groundwater. pp. 132–141. In: *Risk-Based Decision-Making for Assessing Petroleum Impacts at Exploration and Production Sites*. U.S. Department of Energy, 2001.

Spence L, O'Reilly K, Magaw R, and Rixey W. Predicting the fate and transport of hydrocarbons in soil and groundwater. pp. 89–110. In: *Risk-Based Decision-Making for Assessing Petroleum Impacts at Exploration and Production Sites*. U.S. Department of Energy, 2001.

Buscheck T, O'Reilly K, Hickman G. Intrinsic anaerobic biotransformation of chlorinated solvents at a manufacturing plant. pp. 528–535. In: *Natural Attenuation of Fuels and Chlorinated Solvents*. Wiedermeier, Rafai, Newell, and Wilson (eds), John Wiley and Sons, 1999.

McFarland B, O'Reilly K. Environmental impacts and toxicological characteristics of calcium magnesium acetate. pp. 193–228. In: *Deicing Chemicals and the Environment*. D'Itri F (ed), Lewis Publishers, Chelsea, MI, 1992.

Crawford R, O'Reilly K, Tao H. Microorganism stabilization for *in situ* degradation of toxic chemicals. pp. 203–212. In: *Advances in Applied Biotechnology Series Vol. 4*. Kamley D, Chakrabarty A, Omenn G (eds), Gulf Publishing Co., Houston, TX, 1990.

Crawford R, O'Reilly K. Bacterial degradation of chlorophenols. pp. 113–144. In: *Reviews in Environmental Toxicology*. Hodgson E (ed), Toxicology Communications, Raleigh, NC, 1990.

Selected Conference Proceedings

O'Reilly K, Brown J, Pietari J, Boehm P. Establishing the chemical footprint of potential injury from petroleum product releases at fuel terminals. *Promoting the Science of Spill Response, International Oil Spill Conference Proceedings*, 2011.

O'Reilly K, Kolhatkar R, Buscheck T. Guidance on the remediation of ethanol fuel releases: A conceptual model approach. *NGWA Organic Chemicals in Ground Water: Prevention, Detection, and Remediation Conference Proceedings*, National Ground Water Association, 2009.

O'Reilly K, Malono C. A method for predicting whether oily soil is a risk to groundwater: A case study using soil and groundwater samples from oil production sites in Ecuador. Proceedings, VIII Congreso Latinoamericano De Hidrología, 2006.

Camp H, Kulakow P, Smart R, O'Reilly K. Application of chemical tools to evaluate phytoremediation of weathered hydrocarbons. Proceedings, 25th Arctic and Marine Oil Spill Technical Seminar, Environment Canada, 2002.

O'Reilly K, Moir M, Taylor C, Hyman M. Hydrolysis of MTBE: Implications for anaerobic and abiotic natural attenuation. pp. 83–90. In: Biodegradation of MTBE, Alcohol and Ethers. Battelle Press, 2001.

Buscheck T, O'Reilly K, Koschal G, O'Reagan G. Ethanol in groundwater at a northwest terminal. pp. 203–210. In: Biodegradation of MTBE, Alcohol and Ethers. Battelle Press, 2001.

Hyman M, O'Reilly K. Physiological and enzymatic features of MTBE degrading bacteria. pp. 7–12. In: *In Situ* Bioremediation of Petroleum Hydrocarbons and Other Organic Compounds. Battelle Press, 1999.

Nelson S, O'Reilly K, Barbonio M, Vogt G. Laboratory and field testing of engineered denitrification. pp. 91–96. In: Bioremediation of Metals and Inorganic Compounds. Battelle Press, 1999.

O'Reilly K, Duda P, Smart D. Bioslurry treatment of sediment from a refinery's wastewater treatment system. Proceedings, 4th International Symposium: *In Situ* and On-Site Bioremediation, Battelle Press, 5:145–150, 1997.

O'Reilly K, Simpkin T, Sobzack K, Moreno T. Efficacy and economics of composting of aged materials at a refinery. Proceedings, 4th International Symposium: *In Situ* and On-Site Bioremediation, Battelle Press, 2:73–78, 1997.

Buscheck T, O'Reilly K, Hickman G. Intrinsic anaerobic biodegradation of chlorinated solvents at a manufacturing plant. Proceedings, 4th International Symposium: *In Situ* and On-Site Bioremediation, Battelle Press, 3:149–155, 1997.

Schroth M, Istok J, Hyman M, O'Reilly K. Field-scale measurements of in-situ microbial metabolic activities. Proceedings, 4th International Symposium: *In Situ* and On-Site Bioremediation, Battelle Press, 3:387–392, 1997.

Buscheck T, O'Reilly K, Nelson S. Evaluation of intrinsic bioremediation at field sites. Proceedings, Conference on Petroleum Hydrocarbons and Organic Chemicals in Ground Water. National Ground Water Association, pp. 367–382, 1993.

Presentations

O'Reilly KT, Menzie C. Endangered species: Chemicals, places, and climate change. ABA Environmental Law Section Meeting, March 2010.

O'Reilly KT, Pietari J, Boehm P. Assessing the contribution of coal tar sealants to the polycyclic aromatic hydrocarbons of urban sediments: A forensic chemist's perspective. SETAC National Meeting, November 2010.

O'Reilly KT, Brown J, Boehm P, Cook L, Pietari J. Identifying the chemical footprint of petroleum fuel terminal releases in urban settings. SETAC National Meeting, November 2010.

O'Reilly K. Guidance on the remediation of ethanol fuel releases: A conceptual model approach. NGWA Organic Chemicals in Ground Water: Prevention, Detection, and Remediation Conference, Costa Mesa, CA November 2, 2009.

O'Reilly K. Technical approaches for apportioning liability at sediment sites. CERCLA and MTCA Advanced Sediment Conference, Seattle, WA, May 11, 2009.

O'Reilly K. Technical approaches for apportioning liability and allocating environmental costs. Du Page County Bar Association Environmental Bar Section, Wheaton, IL, May 14, 2009.

O'Reilly K. Cost recovery after *Burlington Northern*: The Use of chemical fingerprints. 2009 Illinois Environmental Law Conference, Illinois State Bar Association, Chicago, IL, May 15, 2009.

O'Reilly K, Pietari J, Thorsen W, Hoelen T. Using decision support tools to evaluate TPH field test kits. 19th Annual AEHS West Coast Conference on Soils, Sediments, and Water, San Diego, CA, March 11, 2009.

O'Reilly K, Boehm PD, Johns MW. Technical approaches for apportioning liability and allocating environmental costs. Exponent Webinar Series, December 10, 2008.

O'Reilly K, Boehm PD, Johns MW. Technical approaches for apportioning liability and allocating environmental costs. The ABA Environmental, Energy, and Resources Law Summit, 16th Fall Meeting, Phoenix, AZ, September 18, 2008.

O'Reilly K, Thorsen WA, Pietari J. Strategic site assessment: Tools for managing data uncertainty. Remediation Technology Transfer Workshop, San Luis Obispo, CA, September 17, 2008.

Murphy B, O'Reilly K. Reconstructing doses and exposures using environmental forensic methods. 37th Conference on Environmental Law, ABA Section of Environment, Energy, and Resources, Keystone, CO, March 13, 2008.

Prior Experience

Senior Environmental Specialist, Chevron Energy Technology Company, 1989-2007

Editorial Boards

ABA Superfund and NRD Litigation Committee Newsletter Vice-Chair

Project Experience

- Environmental forensics and contaminant source identification– multiple sites
- CERCLA apportionment and allocation – complex multi-party sites
- Oil spill response – corporate oil spill response team member, incident command system experience - crude pipeline in an agricultural area, gasoline pipeline in wetlands, refinery shoreline
- Consulting expert for current and former oil production site litigation- cases in Louisiana and Texas
- Led industrial trade group efforts evaluating environmental impacts of oxygenates – MTBE, TBA, ethanol
- Manager of water and solid waste issues for offshore oil platforms – California
- Managing risk of oil impacted soil in developing countries – Africa, Asia, South America
- Negotiation of multiple site NPDES permits with EPA (offshore platforms) and California regulators (emerging contaminants)
- Remedial system development and implementation for soil, sediments, and groundwater- PAHs, petroleum, oxygenates, pentachlorophenol, agricultural chemicals
- Strategic site assessment development and application – petroleum and chemical sites
- Chemical aspects of contaminant fate and transport
- Biodegradation and bioremediation consulting
- Industrial whole effluent toxicity assessment and wastewater treatment
- Product risk evaluation and regulatory negotiations – oxygenates, biodegradable plastics, pavement sealants
- Provided training to regulators, lawyers and consultants on a number technical topics through agency-sponsored workshops, professional conferences, and university extension programs
- Patented an environmentally sensitive biocide for preserving specialized petrochemical feed stocks
- Collaborated with the Department of Energy to retrain Russian biological warfare scientists to engage in environmental research
- Evaluated the impact of the Information Quality Act on risk-based regulatory activity of the USEPA.