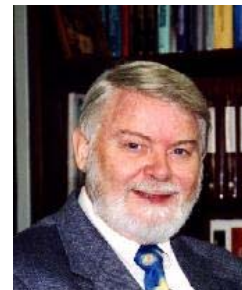


Lawrence H. Keith, Ph.D.

40+ Years of Experience in Environmental Consulting and Expert Witness Testimony



Education - Dr. Keith received a B.S. degree in chemistry from Stetson University in Deland, FL in 1960, a M.S. degree (chemistry) from Clemson University, Clemson, SC, in 1963, and a Ph.D. (chemistry) from the University of Georgia, Athens, GA, in 1966. He has provided professional services in environmental chemistry for over 40 years to government agencies and private industry, including legal firms.

Expert Witness Examples - Dr. Keith provides expert witness testimony for plaintiffs and defendants subjected to environmental litigation based on deficient data, inadequate quality assurance and quality control, poor sampling procedures, old methods, or previously accepted practices. This includes consulting to help plaintiffs and defendants strengthen their environmental analytical data submitted as evidence. Comprehensive reports are prepared with complete referenced sources as aids to ensure strong, thorough depositions. Examples include:

1. Currently (2010) providing consulting, reports, and depositions involving environmental sampling, analysis, and QA/QC data with contaminated land sites for an industrial client. Evaluations include proving that the plaintiffs failed to use basic data quality objective (DQO) planning which resulted in using inappropriate methods to gather data for support of their claims.
2. Currently (2010) providing consulting, reports, and depositions involving environmental sampling, analysis, and QA/QC data with California groundwater wells from several cities plus a historical context involving the evolution of EPA methods and their development and usage. This work is being done for major industrial clients who are defendants in multiple legal cases where modern analytical methods and QA/QC techniques are being compared to those used twenty to forty or more years ago.
3. Provided consulting and recommendations for sampling air and surfaces of contaminated automobiles in Houston, Texas for a major international auto maker.
4. Provided consulting and affidavits on appropriate sampling of soil material for testimony before the Supreme Court of Nova Scotia, Canada for an industrial client.
5. Provided consulting and a report to the State of Louisiana involving environmental testing data and QA/QC performed by LSU with an environmental analytical project.
6. Provided a declaration and consulting involving an equipment company cited in an EPA-listed waste site fire in Texas which showed that improperly stored hazardous wastes rather than the equipment company were to blame for the fire.
7. Provided consulting and a report for a dentist's group which showed that a piece of polymer from the gut of a patient did not originate from dental material that could have been swallowed by the patient.
8. Provided a declaration on perspectives of using old environmental methods for current litigation based on personal and historical knowledge for a large international client.
9. Provided literature researches and a declaration on data quality involving TCE and perchlorate contamination in California groundwaters for an industrial client.
10. Provided consulting and a declaration on appropriate sampling methods for vinyl siding contamination for an industrial client in North Carolina.

Oil Spill Experience – Sampling and analysis of oil spills requires special expertise, especially if data is being obtained for legal cases. Dr. Keith's experience with oil spills and the petroleum and petrochemical industry spans four decades. It began in the earliest days of EPA when he developed Nuclear Magnetic Resonance (NMR) methods for oil spill identification and continues through the present as Principal Investigator on an EPA biodiesel research grant with the University of Georgia and a local

biodiesel company. Critical factors involving oil spill sampling go far beyond chain-of-custody forms and include planning and sampling protocols, representative samples, correct quality control samples, equipment, containers, labels, preservation, and storage. If any of the sampling steps are compromised then the analytical results are also compromised regardless of how well a laboratory performed the analyses. Different factors for analysis include sample preparation, method selection, bias, precision, sensitivity, selectivity, and correct quality control samples. These requirements for reliable data have been published in numerous books and journal articles by Dr. Keith and in 2004 - 2005 he collaborated with an international company in Australia to develop the world's first expert knowledge system for sampling oil spills in any matrix (e.g., oil on surface water, below surface water, tarballs, beaches (both sandy and rocky), sea beds and bottom sediments, wildlife, vegetation, drilling rigs, ships, storage facilities, clean background areas, etc.). This information is critical for plaintiffs and defendants alike when collecting and evaluating the reliability and representativeness of oil spill data being used for evidence in court. Dr. Keith is one of the world's foremost authorities on quality assurance & quality control (QA/QC) for environmental sampling and analysis as documented below with his publications and special expertise.

Special Expertise and Credibility – Dr. Keith has some unusual expertise not typically found with expert witnesses and these involve his long professional experience with U.S. EPA and the American Chemical Society (ACS). He is a past chairman of the ACS Division of Environmental Chemistry and was its newsletter editor for twenty years. He began his career in 1966 as a research scientist with the Southeast Water Research Laboratory in Athens, GA and this became one of EPA's first national laboratories when EPA was created by President Nixon in 1970. He worked as Environmental Chemistry Department Head, Division Manager, Senior Program Manager, and Corporate Fellow at Radian International in Austin, TX for 21 years where he managed a large laboratory and multi-million dollar projects from EPA and other government agencies that involved air, water, soil, oil, petrochemicals, and toxic chemicals. He was a Vice President at the Waste Policy Institute in Blacksburg, VA before leaving to become President of his own company, Instant Reference Sources (in 2001) and Director of Environmental Chemistry with the Environmental & Chemical Safety Educational Institute (in 2006). As a result of his many publications and work he has lectured and taught environmental sampling and analysis and quality control throughout the USA and Canada, Australia, Asia, Europe, and Central and South America. Lastly, he had the honor of being the Keynote Speaker at the “*Legends of Environmental Chemistry Symposium*” in Philadelphia, PA in August 2008 at the ACS National Meeting. Some of the most notable accomplishments that have made him an international authority in his field are listed below (the books may be found at www.Amazon.com).

- He is currently (2010) working with the U.S. Department of State under a contract with Sandia National Laboratory to provide training on environmental sampling and analysis and QA/QC for Pakistan's EPA. In the past he provided similar training to Taiwan's EPA and also to the International Atomic Energy Agency (IAEA) in Vienna, Austria.
- While he was at EPA Dr. Keith was the key scientist that developed EPA's list of “Priority Pollutants” which is still the basis of many of EPA's chemicals that are analyzed for and regulated to this day. This included establishing analytical methods and the minimum levels for analysis and regulation. His work was summarized in the American Chemical Society journal, *Environmental Science & Technology*, and was the most frequently referenced paper of the journal for many years.
- He is the primary author of “*Principles of Environmental Analysis*,” a paper commissioned by the American Chemical Society in 1983 and which is still referenced in many of EPA's regulations that involve environmental analytical data.
- He is the author of “*Environmental Sampling and Analysis – A Practical Guide*,” a book sponsored by the American Chemical Society in 1991 that is still a principal reference today.
- He is the author of “*Principles of Environmental Sampling*” 1st Edition (1988) and 2nd Edition (1996) books published by the American Chemical Society that are still principal references today.

- He and two EPA authors published “EPA’s *Sampling and Analysis Methods Database*” which was the first ever compilation of EPA’s methods in a 3 Volume electronic book in 1990. This was expanded and published as a 1700 page bound book in 1996.
- He was one of the initial developers of the National Environmental Methods Index (NEMI), a free national database of environmental methods used by thousands of scientists each year (see www.nemi.gov); he continues to work with NEMI and also lead the development of a restricted version of it for anti-terrorism use with analytical methods for chemicals that could potentially be used by terrorists.

Publications - Dr. Keith has over 175 publications which include 65 books and book chapters, over 50 electronic books and expert knowledge systems, and more than 50 journal articles, government reports, and patents. Selected publications that are relevant to litigation involving environmental sampling and analysis and QA/QC issues include the following:

1. Keith, L.H. and D.L. Lewis, “How Good is Your Analytical Data?” *Water Environment Laboratory Solutions*, April/May p. 7, 1997.
2. Keith, L.H., "Report Results Right--Part 1," *Chemtech*, 21, pp.352-356, June 1991.
3. Keith, L.H., "Report Results Right--Part 2," *Chemtech*, 21, pp.486-489, August 1991.
4. Keith, L.H., *Reliable Environmental Sampling and Analysis*, Instant Reference Sources, Inc., Austin, TX, 1997.
5. Keith, L.H., G.L. Patton, D.L. Lewis, and P.G. Edwards, Chapter 1, "Determining What Kinds of Samples and How Many Samples To Analyze," in Keith, L.H., ed., *Principles of Environmental Sampling*, 2nd Edition, American Chemical Society, Washington, D.C., 1996.
6. Crumbling, DM, C. Groenjes, B. Lesnik, K. Lynch, J. Shockley, J. van Ee, R. Howe, L. Keith, and J. McKenna, *Managing Uncertainty in Environmental Decisions*, ES&T, pp. 405A – 409A, October 2001.
7. Diamond, J., A. Eaton, C. Annis, H. Brass, L. Keith, A. Strong, D. McChesney, and M. Shockey, *Towards a Definition of Performance-Based Laboratory Methods*, National Water Quality Monitoring Council Technical Report 01-02, Washington, DC., August 2001.
8. Keith, L.H., ed., *Principles of Environmental Sampling*, 2nd Edition, American Chemical Society, Washington, D.C., 1996.
9. Keith, L. H., ed., *Compilation of EPA’s Sampling and Analysis Methods*, 2nd Edition, Lewis Publishers, Inc., Boca Raton, FL, 1996.
10. Keith, L.H., W. Crummet, J. Deegan, Jr., R.A. Libby, J.K. Taylor, and G. Wentler, "Principles of Environmental Analysis," *Anal. Chem.* 55, pp. 2210- 2218, 1983.
11. Keith, L.H., "The Way It Was: Analyses of Organics in Water in 1967," *Environmental Science & Technology*, 25 (4), pp.564-565, April 1991.
12. Keith, L.H., *Environmental Sampling and Analysis - A Practical Guide*, Lewis Publishers, Inc., Boca Raton, FL, 1991.
13. Wineger, E.D. and L.H. Keith, *Sampling and Analysis of Airborne Pollutants*, Lewis Publishers, Inc., Boca Raton, FL, 1993.
14. Keith, L.H., ed., *Identification and Analysis of Organic Pollutants in Air*, Butterworth Publishers, Inc., Woburn, MA, 1984.
15. Keith, L.H. and M.M. Walker, *Handbook of Air Toxics*, Lewis Publishers, Inc., Boca Raton, FL, 1995.
16. Keith, L.H. and M.M. Walker, *EPA's Clean Air Act Air Toxics Database Volumes 1, 2, 3, and 4*, Lewis Publishers, Inc., Boca Raton, FL, 1992.