

## **Dr. G. Fred Lee, PE, DEE**

### **Expertise and Experience in Hazardous Chemical Site and Municipal/Industrial Landfill Impact Assessment/Management**

Dr. G. Fred Lee's work on hazardous chemical site and municipal/industrial landfill impact assessment began in the mid-1950s while he was an undergraduate student in environmental health sciences at San Jose State College in San Jose, California. His academic course and field work involved review of impacts of municipal and industrial solid waste landfills on public health and the environment.

Dr. Lee earned a Master of Science in Public Health degree from the University of North Carolina, Chapel Hill, in 1957. The focus of his master's degree work was water quality evaluation and management with regard to protection of public health and the environment from chemical constituents and pathogenic organisms.

In 1960 Dr. Lee earned a PhD degree in environmental engineering from Harvard University. An area of his specialization during his PhD work was aquatic chemistry. As part of his degree work he undertook additional formal education on the fate, effects, and significance of, and development of control programs for, chemical constituents in surface and groundwater systems, as well as in water management facilities.

For a 30-year period, Dr. Lee held university graduate-level teaching and research positions in departments of civil and environmental engineering at several major United States universities, including the University of Wisconsin-Madison, University of Texas at Dallas, and Colorado State University. During that period he taught graduate-level environmental engineering courses in water and wastewater analysis, water and wastewater treatment plant design, surface and groundwater quality evaluation and management, and solid and hazardous waste management. Dr. Lee has published more than 1,150 professional papers and reports on his research results and professional experience.

Dr. Lee's work on the impacts of hazardous chemical site landfills and municipal/industrial solid waste landfills began in the 1960s. While directing the Water Chemistry Program in the Department of Civil and Environmental Engineering at the University of Wisconsin-Madison, he became involved in the review of the impacts of municipal solid waste landfills on groundwater quality. In the 1970s, while he was Director of the Center for Environmental Studies at the University of Texas at Dallas, he was involved in the review of a number of municipal solid and industrial (hazardous) waste landfill situations, focusing on the impacts of releases from the landfill on public health and the environment. He conducted pioneering work beginning in the 1970s on the impacts of organic solvents on clay liners for landfills and waste piles lagoons.

In the early 1980s, while holding a professorship in Civil and Environmental Engineering at Colorado State University, Dr. Lee served as an advisor to the town of Brush, Colorado on the potential impacts of a proposed hazardous waste landfill on the groundwater resources of interest to the community. Based on that work, he published a paper in the *Journal of the American Water Works Association* discussing the ultimate failure of the liner systems proposed for that

landfill in preventing groundwater pollution by landfill leachate. In 1984 that paper was judged by the Water Resources Division of the American Water Works Association as the “Best Paper” published in the journal for that year.

While holding the joint positions of Director of the Site Assessment and Remediation Division of a multi-university consortium hazardous waste research center and a Distinguished Professorship of Civil and Environmental Engineering at the New Jersey Institute of Technology, Dr. Lee was involved in numerous situations concerning the impact of landfilling of municipal solid waste on public health and the environment. Dr. Lee conducted a comprehensive review of the properties of HDPE liners of the type being used today for lining municipal solid waste and hazardous waste landfills. Attention was focused on the compatibility of such liners with landfill leachate and their expected performance for containing waste-derived constituents for as long as the waste in the landfill will be a threat.

Dr. Lee has served as an advisor to the states of California, Michigan, New Jersey and Texas on solid waste regulations and management. He was also involved in evaluating the potential threat to groundwater quality posed by uranium waste solids from radium watch-dial-painting, that were to be disposed of by burial in a gravel pit. The public in the area of the disposal site proposed by the state of New Jersey objected to the State’s proposed approach. Dr. Lee provided testimony in litigation, which caused the judge reviewing this matter to prohibit the State from proceeding with the disposal of uranium/radium waste at the proposed location.

While serving as a full-time university professor, Dr. Lee was also active as a part-time, private consultant to governmental agencies, industry, and community and environmental groups on water quality, and solid and hazardous waste and mining management issues. His work in that capacity included evaluating the impacts of a number of municipal and industrial solid waste landfills. Much of that work was done on behalf of water utilities, governmental agencies and public interest groups who were concerned about the impacts of a proposed landfill on their groundwater resources, public health and the environment.

In 1989, Dr. Lee retired after 30 years of graduate-level university teaching and research and expanded his part-time consulting into a full-time activity. A principal area of his work since then has been assisting water utilities, municipalities, industry, community and environmental groups, agricultural interests and others in evaluating the potential public health and environmental impacts of proposed or existing hazardous, as well as municipal solid waste landfills. He has been involved in the review of approximately 80 different landfills in various parts of the United States and in other countries (see list at <http://www.gfredlee.com/exp/areawork.htm>).

With Dr. Anne Jones-Lee, his wife, he has published extensively on the issues that should be considered and addressed in developing and evaluating new and expanded municipal solid waste and hazardous waste landfills in order to protect the health, groundwater resources, environment, and interests of those within the sphere of influence of the landfill. Their more than 100 professional papers and reports on landfilling issues provide guidance not only on the problems of today's minimum US EPA Subtitle D landfills, but also on how landfilling of non-recyclable wastes can and should take place to protect public health, groundwater resources, the

environment, and the interests of those within the sphere of influence of a landfill. Their work on landfill issues has particular relevance to Superfund site remediation, since regulatory agencies often propose to perform site remediation by developing an onsite landfill or capping waste materials that are present at the Superfund site. The proposed approach frequently falls short of providing true long-term health and environmental protection from the landfilled/capped waste. Many of their publications and reports prepared on behalf of clients are available as downloadable files from their website ([www.gfredlee.com](http://www.gfredlee.com)) in the [Landfills-Groundwater Hazardous Chemical Sites](#), [Mine Waste Impacts](#), and [Contaminated Sediment](#) sections.

In the early 1990s, Dr. Lee was appointed to the California Environmental Protection Agency's Comparative Risk Project Human Health Subcommittee that reviewed the public health hazards of chemicals in California's air and water. In connection with that activity, he and Dr. Jones-Lee developed a report entitled, "[Impact of Municipal and Industrial Non-Hazardous Waste Landfills on Public Health and the Environment: An Overview](#)" (Lee and Jones-Lee, 1994) [http://www.gfredlee.com/cal\\_risk.htm](http://www.gfredlee.com/cal_risk.htm)), that served as a foundation for the human health advisory panel to assess public health impacts of municipal landfills.

Drs. Lee and Jones-Lee have developed a comprehensive review of the "[Flawed Technology of Subtitle D Landfilling](#)" for protecting public health, groundwater resources and the environment for as long as the municipal solid wastes in a "dry tomb"-type landfill are a threat. It includes a discussion of how municipal landfills can be developed to protect public health and environmental quality. That report is available from their website at <http://www.members.aol.com/apple27298/SubtitleDFlawedTechnPap.pdf>.

In addition to teaching and serving as a consultant in environmental engineering for over 45 years, Dr. Lee is a registered professional engineer in the state of Texas and a Diplomate in the American Academy of Environmental Engineers (AAEE). Membership as a Diplomate in the Academy recognizes his leadership role in the environmental engineering field. For more than 20 years he has served as a Chief Examiner for the AAEE, first in New Jersey and then, since 1989, in north-central California. In this capacity he is responsible for administering examinations for professional engineers with extensive experience and expertise in various aspects of environmental engineering, including solid and hazardous waste management, desiring admission to the Academy.

Dr. Lee's work on landfill impacts has included developing and presenting several two-day short-courses devoted to landfills and groundwater quality protection issues. Those courses have been presented through the American Society of Civil Engineers; the American Water Resources Association; the National Ground Water Association in several United States cities, including New York, Atlanta, Seattle and Chicago; and the University of California Extension Programs at several of the UC campuses, as well as through other groups. Dr. Lee has also participated in a mine waste management short-course organized by the University of Wisconsin-Madison and the University of Nevada.

Dr. Lee has served for many years as an American Chemical Society tour speaker, through which he is invited to lecture on landfills and groundwater quality protection issues, as well as domestic water supply water quality issues throughout the US. Additional information on the

qualifications of Drs. Lee and Jones-Lee to undertake reviews of the potential impacts of landfills and landfill expansions on public health, groundwater resources and the environment is available from their website [gfredlee@aol.com](mailto:gfredlee@aol.com) or by contacting Dr. Lee at gfredlee@aol.com.