JAMES HAROLD CLARKE, Ph.D., BCES, F. AAFS
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EDUCATION: The Johns Hopkins University, Baltimore, Maryland
Ph.D., Theoretical Physical Chemistry, 1973

Rockford College, Rockford, Illinois
B.A., Chemistry, 1967 (with honors)

SECURITY CLEARANCE Q – Nuclear Regulatory Commission

EXPERIENCE:

University Faculty Member

2005-present Vanderbilt University, Nashville, Tennessee
Department of Earth and Environmental Sciences
Professor

2003-present Vanderbilt University
Department of Civil and Environmental Engineering
Director of Graduate Studies-Environmental Engineering

2000-present Vanderbilt University, Nashville Tennessee
Department of Civil and Environmental Engineering
Professor of the Practice

1983-2000 Vanderbilt University, Department of Civil and Environmental Engineering, Nashville, Tennessee
Adjunct Associate Professor, 1996-2000
Co-Lecturer, Environmental Chemistry (graduate and upper level undergraduate students), 1997-2000
Adjunct Assistant Professor, 1983-96

1987-1988 University of Arkansas for Medical Sciences, Little Rock, Arkansas
Adjunct Assistant Professor, Division of Interdisciplinary Toxicology

Advisor and Consultant to the Nuclear Regulatory Commission

2008–present Nuclear Regulatory Commission
Advisory Committee on Reactor Safeguards, consultant

2005-2008 Nuclear Regulatory Commission
Advisory Committee on Nuclear Waste and Materials, Member

Consulting Engineering and Science Firms

2000-present AquAeTer Inc., Brentwood, Tennessee
Consultant and Technical Director for Environmental Forensics

1998-2000 ECKENFELDER/Brown and Caldwell, Nashville, Tennessee
Senior Vice President, 1998-2000
Technical emphasis on environmental forensics, litigation support and expert witness testimony.

1982-1998 ECKENFELDER INC., Nashville, Tennessee
Chairman of the Board, 1997-1998
Strategic business development and overall company management.
Technical emphasis on environmental forensics, litigation support and expert witness Testimony

Chairman, President and Chief Executive Officer, 1989-1997
President and Chief Executive Officer, 1984-89
Overall management and operations responsibility for the company

Vice President and Regional Manager, 1983-84
Management and operations responsibility for the Nashville office

Vice President, 1982-83
Project management and business development responsibilities for projects in air and water quality, environmental assessment,and toxics.

1982 Wehran Engineering, Middletown, New York
Vice President
Project management, business development and group supervision in the overall areas of risk assessment, and contaminated site investigation and remediation.

1980-82 RECRA Research, Inc., Amherst, New York
Senior Vice President
Corporate management and operations responsibilities.

RECRA Environmental and Health Sciences, Inc., Nashville, Tennessee
President
Company management, operations and business development for the Nashville Office.

1975-80 ECKENFELDER INC., Nashville, Tennessee
Project Manager
Project management and business development in the areas or air and water quality management, toxics in the environment, contaminated site investigation and remediation for the Nashville office.

HONORS/AWARDS:

Phi Beta Kappa
National Representative to the Commission on Water Chemistry of the International Union of Pure and Applied Chemistry, 1988
1989 Manager of the Year - Textron Chapter of the National Management Association
Member, Keyboard, Blair School of Music, Nashville, Tennessee
Who's Who in Science and Engineering
Who's Who - Environmental Registry
Who's Who Worldwide
Member, National Academy of Sciences/National Research Council Committee on Remediation of Buried and Tank Wastes, 1992-2000
Executive in Residence, Middle Tennessee State University, 1993-2000
Member, Society of International Business Fellows, 1996-1999
Member, Board of Trustees, Rockford College, Rockford, Illinois, 1996-2006, 2013 – present
T Trustee Emeritus 2006-2013
Chair, Academic Affairs Committee, 1997-2000
Member Academic Affairs Committee 2013-present
Karl C. Williams Award – Rockford College, 1998
Corporate Award from the Department of Energy – Independent Technical Review of the Proposed Sonic Drilling Activities at Pit 9, Idaho National Engineering and Environmental Laboratory, 1999
Fellow, American Academy of Forensic Sciences
Member, Executive Board, American Nuclear Society, Division of Environmental Science, 2005 to 2008
Member, Executive Board, American Nuclear Society, Division of Decommissioning and Environmental Science 2011-present
Consultant to the Nuclear Regulatory Commission, Advisory Committee on Nuclear Waste. 2000-2004
Member, Nuclear Regulatory Commission Advisory Committee on Nuclear Waste and Materials 2005 -2008
Consultant to the Nuclear Regulatory Commission Advisory Committ on Reactor Safeguards, 2008 to present
Distinguished Service Award, Nuclear Regulatory Commission, 2008
Waste Management 08, Best Paper Award
American Academy of Environmental Engineers and Scientists, Board Certified Environmental Scientist (BCES) 2012 - present

PROFESSIONAL AFFILIATIONS

American Academy of Environmental Engineers and Sciences
American Academy of Forensic Sciences, 1998-present, Fellow 2004-present
American Nuclear Society, 2005-present
Executive Committee, Division of Environmental Science 2005-2008
Executive Committee, Division of Decommissioning and Environmental Science 2011-present
International Society of Environmental Forensics, 2009-present
Society for Risk Analysis, 2000-present

SUMMARY OF PROFESSIONAL EXPERIENCE IN ENVIRONMENTAL SCIENCE AND ENGINEERING

Expertise and experience in the overall areas of risk analysis for chemicals and radionuclides, hazardous and radioactive waste management and innovative approaches to the decommissioning and remediation of contaminated sites, environmental forensics and chemistry, fate and transport of chemicals and radionuclides in the environment and the long term management and monitoring of legacy hazardous chemical and nuclear waste sites. Litigation support and expert witness experience in cases concerning contaminant release and migration, source identification, exposure analysis, and

waste management and remediation technologies. Independent technical review assistance to the Department of Energy on the investigation and remediation of subsurface contamination, safety issues associated with sample collection from the INEEL Subsurface Disposal Area (SDA) and the Risk Assessment for the SDA, the DOE risk-based end states approach to contaminated site remediation, the Hanford Integrated Vadose Zone Ground Water Management Plan, low activity waste pretreatment and management and the management of high level, hazardous, and mixed waste.
Over 30 years of professional experience with approximately 150 publications and presentations. Experience in Environmental Forensics, Risk Analysis and Related Areas concerning the Behavioor of Materials Released to the Environment:

Served as an expert witness to the law firm of Miller, Johnson, Snell & Cumminskey in a case involving alleged waste trans-shipment between two superfund sites.

Served as an expert witness to the law firm of Andrews and Kurth in litigation concerning the source and timing of releases of DDT and its metabolites to surface waters and sediments in a tidal environment. Used chemical fingerprinting together with aerial photographs and historical data review.

Served as an expert witness to the law firm of Hill Wallack in a case involving the timing of a release of gasoline from an underground storage tank. Used mathematical modeling of a non reactive tracer (MTBE) together with commercial availability information and first appearance data to date the release.

Served as an expert to Lightfoot Franklin & White for Solutia/Monsanto concerning evolving historical knowledge of environmental transport and fate, potential environmental impacts and standards of practice for management of PCBs.

Served as an expert to McKenna, Long and Aldrirge for Hercules Chemical Company concerning the fate and transport of Toxaphene in the environment and the sources and timing of releases of Toxaphene to the environment.

COURSE DEVELOPMENT AND LECTURES

Main Lecturer and Course Developer

ENVE 264 Environmental Assessment
ENVE 273 Environmental Characterization and Analysis
CE 299 Environmental Sience Capstone Course – Disposal of Nuclear Waste in Deep Geologic Repositories
ES 101 Energy Choices and Environmental Consequences with a Focus on Nuclear Power
ENVE 332 Radioactive Waste Management

Invited Lecturer

ENVE 269 Radiological Aspects of Environmental Engineering
ENVE 296 Saftey, Security and Environmental Risk Management
ENVE 262 Hydrology
ES 140 Introduction to Engineering
ES 101 Energy and Environment
ES 101 The Future of Energy
Phys 243 Health Physics
Phys 304 Radiation Instrumentation and Dosimetry
Phys 307 Advanced Health Physics
H 161 Seminar on Energy and Water Resources
ENVE 299 Nuclear Environmental Engineering

RESEARCH AREAS

Performance Assessment and Confirmation for Near Surface Waste Management Facilities
Ecological Forecasting and Monitoring

Risk-informed Approaches to the Remediation of Contaminated Sites
Long-term Sustainable Environmental Protection
Engineered Barriers, Institutional Controls and Monitoring of Contaminant Isolation Systems
Mathematical Models of the Groundwater-Surface water Interface
Environmental Forensics

PEER REVIEWER – JOURNALS, BOOKS, ASSOCIATIONS and FEDERAL AGENCIES

Department of Energy
Nuclear Regulatory Commission
National Academies
U.S, Environmental Protection Agency
Risk Analysis
International Journal of Soil and Sediment Contamination
Journal of Environmental Informatics
McGraw Hill Publishers
Wiley Interscience

SELECTED PROJECTS and ACTIVITIES:

Expert witness and litigation support in several cases involving the environmental behavior of DDT, PCBs, Toxaphene, petroleum hydrocarbon fuels, heavy metals and cyanide and associated liability determination and cost allocation.

Project Director for several investigations involving the fate and transport of PCBs, dioxins, petroleum hydrocarbons and chlorinated hydrocarbons in the environment and ultimate assessment of exposure and risk.

Project Director for a major site investigation and remediation effort in New England involving a former plastics manufacturing facility consisting of over 20 buildings located near a major river. As a result of manufacturing operations, petroleum hydrocarbons, chlorinated solvents, and PCBs were released to soils, groundwater, and surface waters. Additional sources of petroleum hydrocarbons and PCBs are present as well.

Project Director and Technical Advisor for several projects involving assessment, cleanup, and decommissioning of contaminated buildings; specialized expertise in PCB and PCDF/PCDD studies and risk assessment.

Consultant to the Nuclear Regulatory Commission Committee on Reactor Safeguards and the Division of Waste Management and Environmental Protection

Member of the former Nuclear Regulatory Commission Advisory Committee on Nuclear Waste and Materials
Lead Member on Decommissioning
Chaired two working group meetings on LTR Guidance revisions,
Chaired two working group meetings on Prevention of Legacy Sites
Chaired working group meeting on Monitoring to build Model Confidence
Chaired working group meeting on the West Valley site
Chaired working group meeting on Decommissioning Lessons Learned

Consultant to the Nuclear Regulatory Commission Advisory Committee on Nuclear Waste concerning the proposed geologic repository for spent fuel and high level waste at Yucca Mountain.

Consultant to the Nuclear Regulatory Commission Office of Nuclear Materials Safety and Safeguards concerning contaminated site decommissioning and remediation

Principal investigator for a comparative risk assessment of nuclear fuel cycles for the Electric Power Research Institute (EPRI).

Principal investigator and co-principal investigator for several environmental remediation related activities at Department of Energy former nuclear weapons sites including Hanford, Oak Ridge, Idaho National Laboratory and the Savannah River Site.

Principal investigator for research projects on near surface disposal of nuclear wastes funded by the Department of Energy, Office of Environmental Management.

Member of an independent review panel for remediation activities at the former West Valley spent fuel reprocessing site in New York.

Member of an independent peer review panel concerning potential safety issues associated with the use of sonic drilling to characterize buried wastes in the Subsurface Disposal Area at the Idaho National Engineering and Environmental Laboratory.

Member of an independent peer review panel concerning the interim risk assessment performed for the Subsurface Disposal Area at the Idaho National Engineering and Environmental Laboratory.

Chair of a working group on Contamination Containment and Control for the development of the Science and Technology Roadmap for Long Term Stewardship prepared by the Idaho National Engineering and Environmental Laboratory for the Department of Energy

Project Director and Technical Advisor for several comprehensive nation-wide environmental audits performed in conjunction with anticipated mergers/acquisitions of industrial facilities, divisions, and corporations. Chemicals of concern covered a wide range of petroleum hydrocarbons, chlorinated hydrocarbons, and heavy metals.

Project Director and Technical Advisor for numerous investigations and remediations of spills and uncontrolled waste disposal sites including several priority Superfund sites. Responsibilities included overall design and implementation of hydrogeological and water quality investigations, long-term chemical monitoring programs, safety programs, and air quality assessment, together with selection and evaluation of environmentally-sound and cost-effective engineering solutions.

Project Manager for an investigation of an uncontrolled 200-acre industrial landfill for an industrial client in the southeast. The investigation included comprehensive chemical sampling and analysis of soils, groundwaters, surface waters, sediments, and biota. Evaluations of potential adverse health effects were performed for past exposures to humans and biological communities. Remedial options were evaluated based on associated risks. A long-term monitoring program was designed for groundwater, surface water, sediment, and biological communities.

Project Manager of a comprehensive environmental impact assessment for a new integrated iron and steel making facility in Birmingham, Alabama. The study was performed under a third party agreement with the U.S. Steel Corporation and the U.S. Environmental Protection Agency, Region IV. Computer modeling of air and water quality impacts was performed together with extensive baseline definition of preconstruction environmental quality.

One of the principal authors of the Personnel Training Guidance Manual for Owners or Operators of Hazardous Waste Management Facilities. The manual, prepared for the U.S. Environmental Protection Agency, identifies suggested areas and levels of training by job description and existing sources of information.

Numerous developments and applications of computer aided mathematical models of air and water quality impacts associated with industrial emissions and effluents, including specific toxic substances and temperature. Projects include use of 2-D dynamic estuary models, temperature prediction models for stratified lakes and lagoons, and air dispersion

models of spills of hazardous materials. Contributed chapters to a Water Quality Modeling Manual prepared for the Water Quality Control Board of the Commonwealth of Virginia.

Authored several documents on health effects for the USEPA Center for Environmental Research Information, including monographs on in-vivo toxicity testing, inhalation toxicology, and health effects of non-ionizing radiation.

Designed an air monitoring program for a regional hazardous waste management facility utilizing wastewater treatment and secure chemical landfilling. Air monitoring stations were selected with the aid of a mathematical model of air emissions and corresponding air quality.

Analyzed the cost of water pollution controls necessary to achieve best practicable control technology (BPT) and best available control technology (BAT) for the iron and steel industry and the primary and secondary aluminum industries as part of a comprehensive update to the USEPA.

Project Manager for an environmental assessment investigation of petroleum extraction activities off the coast of Venezuela and in the Orinoca Delta.
Project Manager for an extensive evaluation of an industrial wastewater treatment facility. The investigation featured use of radio labeled isotopes and mathematical modeling to determine the fate of nitrogen compounds and the impact of spills and short circuiting on effluent quality.

Project Manager for comprehensive study of raw waste load and effluent quality for tire manufacturing facilities. The study was performed for the Rubber Manufacturers Association and defined a basis for subcategorization of plants within the industry.

Principal investigator for numerous environmental risk assessments utilizing bioassays with aquatic and mammalian organisms and biomonitoring with indicator organisms. These investigations addressed point source effluents, wastes being evaluated for ocean and land disposal, and off-spec product materials.

Trained numerous representatives of industry and government in chemical hazard recognition, hazardous waste management, safety and health effects, contingency planning, and environmental regulations including representatives from various manufacturing industries, the USEPA Environmental Response Team, the U.S. Coast Guard, and several state groups including New York and Maine.

Project Manager for preparation of an Environmental Impact Statement for construction and operation of 25 miles of new interstate highway in West Tennessee. The investigation included extensive evaluations of potentially impacted wetland areas and computer modeling of air quality and noise.

Numerous developments and applications of noise models including the evaluation of the impact of a new automobile raceway on the surrounding community, restoration of several Union Stations to government office buildings, construction and operation of several new postal facilities, and several highway improvement projects.

Research in in-situ vapor stripping; the mathematical modeling of biological treatment systems, clarifiers, and foam flotation columns; use of indicator organisms to determine environmental quality; and application of statistical techniques to effluent quality data and interpretation of ground water monitoring data.

PUBLICATIONS and PRESENTATIONS:

”An Ecological Multidisciplinary Approach to Protecting Society, Human Health, and the Environment at Nuclear Facilities”, Joanna Burger, Michael Gochfeld, Charles W. Powers, David S. Kosson and James H. Clarke,. in preparation.

“Evaluating the Collective Radiation Dose to Workers from the U.S. Once-Through Nuclear Fuel Cycle.” Krahn, S.L., A.G. Croff, B.L. Smith, J.H. Clarke, A.G. Sowder, A.J. Machiels, Journal of Nuclear Technology. 185(2):192-207, 2014.

"Evaluating the Collective Radiation Dose to Workers from the U.S. Once-Through Nuclear Fuel Cycle", Krahn, Steven, Croff, Allen, Smith, Bethany, Clarke, James, Sowder, Andrew, and Machiels, Albert. *Health Physics Society Annual Meeting*, 13-17, Baltimore, MD, USA, July 2014.

"A Decision Analysis Tool to Support Planning and Decision-Making for Sustainable, Deployment-Oriented Research, Development and Demonstration (RD&D) of Advanced Nuclear Energy Technologies", Krahn, Steven, Ault, Timothy, Gardiner, Andrea, Croff, Allen, Clarke, James, Machiels, Albert, and Sowder, Andrew *International Congress on Advances in Nuclear Power Plants (ICAPP)*, Charlotte, NC, USA, April 6-9, 2014.

"Estimating Worker Collective Doses from a Revised Approach to Managing Commercial Used Nuclear Fuel", Smith, B.L., S. L. Krahn, J.H. Clarke, A.G. Croff, K.G. Brown, A. Machiels, A. G. Sowder, ANS Winter Meeting. (ANS). Anaheim, CA, Transactions of the ANS, 2014.

"The Environmental, Health and Safety Risks of the Transition from the Present U.S. Once-Through to a Modified Open Nuclear Fuel Cycle". Smith, B.L, S. L. Krahn, J. H. Clarke, K. G. Brown, A. Machiels, A. G. Sowder ICAPP, Charlotte, NC (ANS)., 2014.

"Developing Operational Safety Performance Measures For Nuclear Chemical Facilities", L. Fyffe, J. Hutton, J. Clarke and S. Krahn, Trans. of the American Nuclear Society, 14th International High Level Radioactive Waste Conference, pgs. 311-315, 2013.

"Habitat Protection for Sensitive Species: Balancing Species Requirements and Human Constraints Using Bioindicators as Examples", J. Burger, M. Gochfeld, C. W. Powers, L. Niles, R. Zappalorti, J. Feinburg, and J. H. Clarke, Natural Science, 5, No. 5A, pp50-62, 2013.

"Near Surface Disposal Performance Assessment: Modeling Monthly Precipation and Temperature in Various Climate Environments", Roneisha W. Worthy, James H. Clarke and Mark Abkowitz, Remediation Fall 2013.

"Simulating the Impact of Cover Degradation on RCRA Landfill Performance", Roneisha W. Worthy, James H. Clarke and Mark Abkowitz, Remediation Fall 2013.

"Environmental, Health and Safety Aspects of Uranium Mining and Recovery.", Smith, B.L., S. L. Krahn, J.H. Clarke, A.G. Croff, K.G. Brown, A. Machiels, A. G. Sowder ANS Winter Meeting Panel Session, Uranium Recovery and Reclamation (Presentation only), 2013.

"Modeling the Environmental Health and Safety Risks of the Present U.S. Nuclear Fuel Cycle", Smith, B.L., K. G. Brown, S. L. Krahn, J. H. Clarke, A. Machiels, A. G. Sowder, International High-Level Radioactive Waste Management.. Albuquerque, NM (ANS), 2012.

"U.S. Chemical Safety Board Reports and Relevant Guidance for Nuclear Chemical Facilities", L. Morgan, J. Hutton, J. Clarke and S. Krahn, , Trans. of the American Nuclear Society Winter Meeting, Vol. 107, pg. 307, 2012.

"Assessment of Radiological and Chemical Risks of the Once-Through U-235 Fuel Cycle", invited. Smith, B.L., J. Clarke, S. Krahn, A. Machiels, A. Sowder ANS Winter Meeting. (ANS). San Diego, CA, Transactions of the ANS. Vol. 107: pp. 129-132, 2012.

"A Comprehensive Radiological and Chemical Risk Assessment of the Open Nuclear Fuel Cycle (Development of a Conceptual Model)". Smith, B.L., S. L. Krahn, J.H. Clarke, A. Machiels, A. G. Sowder ANS Annual Meeting. ANS. Chicago, IL. Vol. 106: pp. 147-148, 2012.

"Monitoring the Long-Term Performance of Engineered Containment Systems: Probabilistic Performance Assessment for Dominant Ecological Processes", Brooke Traynham, James H. Clarke, Joanna Burger, and W. Jody Waugh submitted to Remediation, January 2012.

"An Application of Event Tree Analysis to Ecological Systems: Understanding the Long-Term Performance of Engineered Covers", Brooke Traynham, James H. Clarke, Joanna Burger and W. Jody Waugh, submitted to Remediation, January 2012.

"Information Needs for Siting New and Evaluating Current, Nuclear Facilities: Ecology, Fate and Transport, and Human Health", Joanna Burger, James H. Clarke and Michael Gochfeld, Environ Monit Assess. 172(1-4):121-34., 2011.

"A Revolutionary Masters Degree Curriculum in Nuclear Environmental Engineering", Steven L. Krahn, David S. Kosson, James H. Clarke, presented at the 2011 Winter meeting of the American Nuclear Society, Washington D.C., November, 2011.

"A Systems Approach to Teaching Radioactive Waste Management", Steven L. Krahn, David S. Kosson, James H. Clarke, presented at the 2011 Winter meeting of the American Nuclear Society, Washington D.C., November, 2011.

"Development of a Risk Informed Approach to D&D Priority Setting for Department of Energy Surplus Facilities" James H. Clarke, Charles W. Powers, Henry Mayer, and David S. Kosson, presented at the 2011 Winter meeting of the American Nuclear Society, Washington D.C., November, 2011.

"Impact of Anthropogenic Climate Change on Near Surface Disposal Facilities", Roneisha S. Worthy, Mark Abkowitz, Craig S. Benson, and James H. Clarke, presented at the 2011 Winter meeting of the American Nuclear Society, Washington D.C., November, 2011.

"Analysis of Modeling Capabilities to Predict Disposal Facility Cover Design and Performance at DOE Sites", Roneisha S. Worthy, Mark Abkowitz, James H. Clarke and Craig S. Benson, presented at Waste Management 2011, Phoenix 2011, February 2011.

Decommissioning of Nuclear Facilities and Stakeholder Concerns, James H. Clarke, Joanna Burger, Charles W. Powers and David S. Kosson, Science and Stakeholders, Springer, 2011

"Assessing the Importance of Ecological Processes through Biomonitoring and Ecological Forecasting at Nuclear Materials and Waste Sites", Brooke Traynham, Joanna Burger and James H. Clarke, Radiological Assessment, Springer, 2010.

"Building Confidence in Performance Assessments", Joseph H. Rustick, James H. Clarke and Martin LeTourtneau, presented at Waste Management 2011, Phoenix,AZ, February 2011

"Development of a Risk-Informed Approach to Setting D&D Priorities", James H. Clarke, Charles W. Powers and David S. Kosson, American Nuclear Society Topical Meeting and Technology Focus on DD&R, invited presentation, Idaho Falls, ID, August 2010.

"Estimating the Frequencies of Drop Events During the Preclosure Emplacement Period at Yucca Mountain, NV", Leah Spradley, Mark Abkowitz and James H. Clarke, Nuclear Technology v170, pp 322-335, May 2010.

"Estimating Surface Facility Throughput During the Pre-Closure Emplacement Period at Yucca Mountain, NV", Leah Spradley, Mark Abkowitz and James H. Clarke, v. 169, pp 180-194, February 2010.

"Tool for Assessment of Process Importance at the Ground Water/ Surface Water Interface', Ravi. C. Palakodeti,E ugene J. LeBoeuf and James H. Clarke, Journal of Environmental Management, 2009.

"Monitoring the Long-Term Performance of Engineered Containment Systems: Role of Ecological Processes", Brooke Trayhnam, James H. Clarke, Joanna Burger and Jody Waugh, Waste Management 09.

"Evaluation of Transportation and Acceptance Strategies Associated with the Potential Yucca Mountain Waste Management System", Leah L. Spradley, Mark Abkowitz and James H. Clarke, Nuclear Technology v. 165, pp 209-221 Feb 2009.

'Life-Cycle Risk Analysis for U.S. DOE Wastes in Shallow Land Burial', Kevin G. Brown, David S. Kosson, Charles W. Powers, James H. Clarke, and Frank L. Parker, Waste Management 09.

"Improving Consistency of Performance Assessments in the U.S. DOE Complex", Martin J. LeTourneau, Steven Khran, David S. Kosson, Charles W. Powers, James H. Clarke, Roger R. Seitz and Elmer L. Wilhite, Waste Management 09.

"Evaluating the Potential Impact of Using the Transport, Aging and Disposal (TAD) Canister on Yucca Mountain Pre-Closure Operations, Leah Spradley, Mark Abkowitz and James H. Clarke, accepted for publication in RadWaste (Best Paper Award – Waste Management 08 Conference)

"Monitoring the Long Term Performance of Engineered Containment Systems: What Can We Learn from Ecological Monitoring Approaches?", Brooke Traynham and James H. Clarke, Waste Management 08, Phoenix, AZ (February, 2008).

"Evaluating the Potential Impact of Using the Transport, Aging and Disposal (TAD) Canister on Yucca Mountain Pre-Closure Operations", Leah L. Spradley, James H. Clarke and Mark Abkowitz, Waste Management 08, Phoenix, AZ (February, 2008).

"Managing Residual Contaminants – Reuse and Isolation Case Studies", Kevin M. Kostelnik and James H. Clarke, Remediation, Spring 2008.

"Modeling Approaches for the Groundwater/Surface Water Interface: Critique, Challenges, and Needs for the Future", R. C. Palakodeti, E. J. LeBoeuf, J. H. Clarke, C. R. Bartlett and N. R. Grosso, submitting editor requested revisions to the Journal of Contaminant Hydrology.

"A Screening Tool for Determination of Process Importance Across the Ground Water/Surface Water Interface", R. C. Palakodeti, James H. Clarke and E. J. LeBouef, Annual Meeting of the Geological Society of America, Denver, CO, October 2007.

"A Comparison of Carbon Calculators", Joseph P. Padgett, Anne C. Steinemann, James H. Clarke, Michael P. Vandenbergh, Environmental Impact Assessment Review, 28, pp 106-115, 2008.

"Thoughts on Education and the Nuclear Renaissance: What Have We learned that Could be Important This Time?"" participation as **invited panel member** for and presentation in Session on "Preserving Worldwide Nuclear Competency – Where Education Institutonal Knowledge and Industry Meet", Waste Management 07, Tucson AZ, February 2007

"State vs. Acme Manufacturing" **invited participation** as an expert in a Mock Daubert Hearing, annual meeting of the Americn Academy of Forensic Sciences, San Antonio, TX, February 2007.

"Should Environmental Forensics Just Be About Liability For the Past, or Can It Help Us Avoid Liability in the Future?", J. H. Clarke and K. M. Kostelnik, **invited presentation,** annual meeting of the American Academy of Forensic Sciences, San Antonio, TX, February 2007.

"The U. S. Experience with Uranium Recovery and Remediation of Uranium Mill Tailings Sites" James H. Clarke and Frank L. Parker, presented in a workshop on Cleaning Up Sites Contaminated by Radioactive Materials, sponsored by the US Academy of Sciences and the Russian Academy of Sciences, Moscow, Russia (June 2007).

"The U.S. Experience of Remediation of Uranium Mill Tailings Sites and Comparison with the Russian Experience", Frank L. Parker and James H. Clarke, presented in a workshop on Cleaning Up Sites Contaminated by Radioactive Materials, sponsored by the US Academy of Sciences and the Russian Academy of Sciences, Moscow, Russia (June 2007).

"A Mock Daubert Hearing based on New Mexico vs. General Electric", played the role of the expert whose testimony is beng challenged, **invited presentation** National Ground Water Association Ground Water and Environmental Law Conference, Chicago, IL, July, 2006.

"Engineered Containment Systems for Hazardous and Radioactive Wastes – Do Current Approached Present Opportunities for Future Environmental Forensics? The Need for Sustainable Long-Term Protection", **invited presentation** National Ground Water Association Ground Water and Environmental Law Conference, Chicago, IL, July, 2006.

"Preparing to Fuel Our Economy Before the Well Runs Dry" **invited presentation** to the Annual Meeting of the Southeast Association of Airport Executives, Nashville, TN, May 2006

"A Sustainable Environmental Protection System for the Management of Residual Contaminants", K. M. Kostelnik, J. H. Clarke, J. L. Harbour, F. Sanchez, and F.L. Parker, Long-Term Management of Contaminated Sites, **invited contribution** to a special issue of Research in Social Problems and Public Policy, v. 13, pp 117-137 (2007)

"A Risk Assessment Methodology for Intentional Chemical and Biological Contamination of Distribution Systems", L. Spradley, M. Abkowitz and J. H. Clarke, Journal of Homeland Security and Emergency Management, v. 3, issue 3 (2006)

The Integration of Engineered and Institutional Controls: A Case Study Approach with Lessons Learned from Previously Closed Sites", K. M. Kostelnik, J. H. Clarke and J. L. Harbour, Proceedings of the 05 Waste Management Conference, Tucson, AZ, February, 2005

"A Sustainable System for Residual Hazards Management", K. M. Kostelnik, J. H. Clarke and J. L. Harbour, Proceedings of The Second International Conference on Prevention, Assessment, Rehabitation and Development of Brownfields Sites, Siena, Italy, June 2004.

Performance and Verification of Barriers Through Prediction and Monitoring, C. Chien, A.Gatchett and G. Chamberlain (eds), contributor to Chapter One - Damage and System Performance Prediction, CRC Press, 2005.

"A Review of the Literature on Institutional Controls with a Focus on the Management of Residual Hazards", K. M. Kostelnik, J. H. Clarke and J. L. Harbour, submitted to Research in Social Problems and Public Policy.

"Containment of Legacy Wastes during Stewardship" J.H. Clarke, L. G. Everett and S. Kowall, International Seminar on Nuclear War and Planetary Emergencies 30th Session, World Scientific Publishing Co. Pte. Ltd., 2004.

"Engineered Containment Systems for Radioactive and Hazardous Waste: Do Current Approaches Present Opportunities for Future Environmental Forensics?" J. H. Clarke, K. M. Kostelnik, A. N. Clarke and L. G. Everett, Proceedings of the Annual Meeting of the American Academy of Forensic Sciences, Dallas, TX, February 2004

"Engineered Containment and Control Systems: Nurturing Nature", J. H. Clarke, M. M. MacDonell, E. D. Smith, R. J. Dunn and W. J. Waugh, Risk Analysis 24 (3), pp 771-779, June 2004.

"The Integration of Engineered and Institutional Controls" J. H. Clarke and K.M. Kostelnik, **, invited presentation,** CRESP workshop on The *Real* Obstacle to Site Completion: Credible Post-Remediation Sustainable Protection at Contaminated Sites with Residual Waste, Washington D.C. January, 2006.

"Energy – Challenges for Environmental Scientists and Engineers", David S. Kosson and James H. Clarke, National Cross-Disciplinary Workshop in Engineering and Geoscience: Process-Driven Risk Assessment and Sustainable Mitigation Strategies, Nashville, TN, September 2005.

"Decommissioning: 2005 and Beyond", J. H. Clarke, presented to the Nuclear Safety Commission of Japan, Tokyo, Japan, May, 2005.

"The Integration of Engineered and Institutional Controls: A Case Study Approach With Lessons Learned From Previously Closed Sites", K. M. Kostelmik, J. H. Clarke and J. L. Harbour, Waste Management 05, Tucson, AZ, March, 2005.

"Risk in Technically Severe Environments: Contaminant Isolation Facilities", J. H. Clarke, K. M. Kostelnik, J. L. Harbour, F. Sanchez, F. L. Parker and D. S. Kosson, Annual Meeting of the Society for Risk Analysis, Palm Springs, CA, December, 2004.

"The USEPA Regulations Governing Contaminated Site Investigation and Remediation ", presented to the Division of Waste Management and Environmental Protection, Nuclear Regulatory Commission, in a Workshop on Contaminated Site Decommissioning and Remediation, September, 2004 (invited presentation).

“The USEPA Approach to Risk Assessment”, presented to the Division of Waste Management and Environmental Protection, Nuclear Regulatory Commission, in a Workshop on Contaminated Site Decommissioning and Remediation, September, 2004 (invited presentation).

"The Integration of Engineered and Institutional Controls: Lessons Learned from Previously Closed Sites", K. Kostelnik and J. H. Clarke, presented to the Workshop on Research and Needs for Durable Institutional Controls at Sites with Residual Contamination, Vanderbilt Universioty, July 8, 2004 (invited presentation).

"A Sustainable System for Residual Hazards Management", K. M. Kostelnik, J. H. Clarke and J. L. Harbour, Proceedings of The Second International Conference on Prevention, Assessment, Rehabitation and Development of Brownfields Sites, Siena, Italy, June 2004.

"Sustainable Residual Hazards Management-Long Performance of Institutional Control Systems", presented to the IGERT Reliability and Risk Management Program participants, Vanderbilt University, April, 2004.

"Engineered Containment Systems for Radioactive and Hazardous Waste: Do Current Approaches Present Opportunities for Future Environmental Forensics?" J. H. Clarke, K. M. Kostelnik, A. N. Clarke and L. G. Everett, Proceedings of the Annual Meeting of the American Academy of Forensic Sciences, Dallas, TX, February 2004

"Forecasting Long Term Containment System Performance - Covers for Contaminated Soil and Waste Materials", F. Sanchez, F. L. Parker and J. H. Clarke, Annual Meeting of the Society for Risk Analysis, Baltimore, MD, December 2003.

"A Sustainable Environmental Protection System for the Management of Residual Hazards", K. M. Kostelnik, James H. Clarke and J. L. Harbour, Annual Meeting of the Society for Risk Analysis, Baltimore, MD, December 2003.

"Using Environmental Forensics to Explain the Unexplainable", J.H. Clarke and Ann N. Clarke, Annual Meeting of the American Academy of Forensic Sciences, Chicago, IL, February 2003

"Long Term Management and Monitoring of Legacy Nuclear and Hazardous Waste", J. H. Clarke, L. Everett and S. Kowall, 29th Annual Seminar on Planetary Emergencies, World Laboratory, World Federation of Scientists, Erice, Italy, August, 2003

"Long-Term Management of Contained Radioactive and Hazardous Waste" Seminar presented to the Department of Civil and Environmental Engineering, Vanderbilt University, 2003

"Engineered Containment and Control Systems: Nurturing Nature", J. H. Clarke, M. M. MacDonell, E. D. Smith, R. J. Dunn, W. J. Waugh, R. D. Waters and D. E. Burns, Annual Meeting of the Society for Risk Analysis, New Orleans, LA, December, 2002. (Best Paper Finalist)

"Residual Hazards Management", K. M. Kostelnik, J. H. Clarke and J. L. Harbour, Annual Meeting of the Society for Risk Analysis, New Orleans, LA, December, 2002.

"A Critical Review of Contaminant Release Dating Techniques", J. H. Clarke and A. N. Clarke, Annual Meeting of the American Academy of Forensic Sciences, Atlanta, GA, February, 2002.

"Evaluating Requirements for Stewardship of Contamination Isolation Facilities", F. Sanchez, J. Clarke, and F. Parker, Waste Management 02 Conference, Tucson, AZ, February, 2002.

"The Science, Policy and Regulation of Contaminant Release: A Key to Real Stewardship", D. S. Kosson, F. Sanchez, F. L. Parker and J. H. Clarke, Society for Risk Analysis Conference on Risk Analysis in an Interconnected World, Seattle, Washington, December 2001

"Long Term Stewardship: Do We Need A New Paradigm?", J. H. Clarke, F. L. Parker, F. Sanchez, W. P. Hamilton and D. S. Kosson, International Containment and Remediation Conference, Orlando Florida, June 2000.

"Collecting and Interpreting Data to Answer Forensic Questions (Or Things I Wish Had Been Done) ", J. H. Clarke, D. J. Wilson, and A. N. Clarke, accepted for presentation at the 52nd Annual Meeting of the American Academy of Forensic Sciences, Reno, NV, February, 2000.

"Environmental Science and Engineering in Forensics – Working With Attorneys in Environmental Litigation", presented to the Vanderbilt University School of Engineering, Department of Civil and Environmental Engineering, Nashville, TN, April 1999.

"Debunking Junk Science (or One Piece of Reliable Data Can Be Worth A Thousand Theories)", J.H. Clarke, R. D. Norris and R.D. Mutch, accepted for presentation/publication in the Annual Meeting of the American Association of Forensic Scientists, Orlando, FL, February (1999).

"Forensic Environmental Chemistry" presented to faculty and students of Tennessee State University, Nashville, TN, March 18, 1998.

"Environmental Forensics" presented to the Environmental Practice Group of the Law Firm of Sidley & Austin, Chicago, IL, February 1998.

"Hydrogeological and Environmental Chemistry Components of Forensic Science", presented to the Environmental Practice Group of Sonnenschein, Nath and Rosenthal, Washington, D.C., November 1997.

"An Overview of Defense Waste and the DOE Environmental Restoration Efforts in the U.S.", J.H. Clarke, A.N. Clarke, presented to the University of Miami Law School, Coral Gables, FL, April 1997.

"The Evaluation of Environmental Management Approaches and Technologies from 1970 to the Present", J.H. Clarke, presented to the Institute of Management Accountants, Chief Executive Seminar Series, Nashville, Tennessee, February, 1997.

"DOE/DOD Site Remediation", Session Chair, HazMat International, Atlantic City, NJ, June, 1996.

"Barriers Workshop Summary," Summary of the Workshop on Barriers Technology Sponsored by the Department of Energy and the National Academy of Science, presented to ER'95, Denver, Colorado, August 1995.

"Barriers For Long Term Isolation," Co-Chair of a Workshop Sponsored by the Department of Energy and the National Academy of Science, Denver, Colorado, August 1995.

"Improving Risk Communication Through Community Involvement," Invited Panel Member, Conference Sponsored by the Massachusetts Department of Public Health, The Agency for Toxic Substances and Disease Registry, the Massachusetts Health Research Institute, and Northeastern University, Boston, Massachusetts, July 1995.

"Innovative Technologies for Hazardous Waste Site Remediation", Session Chair, HazMat South, Orlando, Florida, February, 1994.

"PCB, Dioxins and Furans; Toxicology, Transport and Remediation", Session Chair, HazMat South, Orlando, Florida, February, 1994.

"The Chemodynamics of PCBs in the Subsurface", J.H. Clarke and R.D. Mutch, presented at HazMat South, Orlando, Florida, February, 1994.

“Building Decontamination Prior to Reoccupancy/Demolition” J.H. Clarke, A.N. Clarke, and R.J. Devaney, presented at HazMat South, Orlando, Florida, February, 1994.

“Community Relations and Business Techniques” Session Chair, The Second Annual Caribbean HazTech Conference, San Juan, Puerto Rico, October, 1992.

"Chemodynamics Approaches to Exposure Analysis, presented to the Division of Environmental Chemistry and Biology," The Johns Hopkins University School of Public Health, Baltimore, Maryland, April 1992.

"Risk Assessment with Application to PCBs and Dioxins," presented to the University of Miami School of Law, March 1992.

“Remediation of Contaminated Soils and Rocks”, Robert D. Norris, James H. Clarke and Kenton H. Oma, ASCE Geotechnical Seminar, December, 1991.

“Risk Assessment” Session Chair, HazTech International, San Juan, Puerto Rico, November, 1991.

“Emerging Technologies for the Remediation of Contaminated Soil”, Session Chair, HazMat International, Atlantic City, New Jersey, June 1991.

“On Selecting An Environmental Consulting/Testing Firm”, presented in a Seminar on The Environment and the Law, hosted by the law firm of King and Ballow, Nashville, TN, March, 1991.

"Analysis of Polychlorinated Dibenzofurans and Polychlorinated Dibenzodioxins: I. An Inter- and Intra-Laboratory Evaluation of Various Protocols for Congener Specific Analyses of Sediments and Residues," and "Analysis of Polychlorinated Dibenzofurans and Polychlorinated Dibenzodioxins: II. An Inter- and Intra-Laboratory Evaluation of Materials of Construction," A. N. Clarke, J. H. Clarke, R. J. Devaney, F. L. DeRoos, and M. J. Miille, presented at the Dioxin ‘90 Conference, Bayreuth, Germany, September 1990.

"Design and Implementation of A Sampling Program for PCB/PCDF/PCDD Residuals in Materials of Construction Found in Old Manufacturing Buildings Targeted for Demolition," J. H. Clarke, A. N. Clarke, L. M. Hodges, S. D. MacMillin, and R. J. Devaney, presented at the Electric Power Research Institute Conference, San Jose, CA, June 1990.

“Emerging Technologies for Soil Treatment”, Session Chair, HazMat International, Atlantic City, New Jersey, June, 1990.

“In-Situ Treatment Technologies”, Session Chair, HazMat Central, Rosemont, Illinois, March, 1989.

"In Situ Vapor Stripping: Preliminary Results of a Field-Scale USEPA/Industry-Funded Research Project," J. H. Clarke, R. D. Mutch, Jr., A. N. Clarke and D. J. Wilson, presented at Superfund ‘89, Hazardous Materials Control Research Institute, Washington, DC., 1989.

"Remediation of Solvent Contaminated Soils Using In Situ Vapor Stripping," J. H. Clarke, presented at Conference on Developing and Implementing Alternative Remedial Technologies, Sponsored by the New York Legislative Commission on Toxic Substances and Hazardous Wastes, Grand Island, New York, 1988.

"Remediation of Contaminated Structures - Part I: Investigative Strategies and Methodologies," J. H. Clarke, S. D. MacMillin, A. N. Clarke, and L. M. Hodges, presented at The First Annual Hazardous Materials Management Conference/Central, Rosemont, Illinois, 1988.

"Applications of In Situ Vapor Stripping Technology to Contaminated Soils," J. H. Clarke and D. J. Wilson, presented at The First Annual Hazardous Materials Management Conference/Central, Rosemont, Illinois, 1988.

"An Overview of In Situ Management Technologies Including Innovative Approaches," J. H. Clarke and R. D. Mutch, Jr., presented at the HAZMAT West Conference, Long Beach, California, 1987.

"Practical Considerations In Regulatory Compliance Training: How to Save Money and Avoid Problems," A. N. Clarke and J. H. Clarke, presented at the HAZTECH International Conference, St. Louis, Missouri, 1987.

"A Tiered Approach to Estimating Environmental Concentrations," L. M. Hodges and J. H. Clarke, presented at the International Congress on Hazardous Materials Management, Chattanooga, Tennessee, 1987.

"Recent Advances in the In Situ Management of Uncontrolled Waste Disposal Sites," R. D. Mutch, Jr., J. H. Clarke, and J. V. Rouse, presented at Third National Water Conference, Philadelphia, Pennsylvania, 1987.

"Interpretation of Ground Water Monitoring Data - An Integrated Systems Approach," M. R. Brother and J. H. Clarke, presented at the Southeastern FOCUS on Ground Water Issues Conference Proceedings, Tampa, Florida, 1986.

"Impact of the 1984 RCRA Amendments on Training Requirements," A. N. Clarke and J. H. Clarke, presented at the 1985 HAZPRO Symposium, Baltimore, Maryland; and 1985 HAZMAT Symposium, Philadelphia, Pennsylvania, 1985.

"Quantifying Impacts From Waste Disposal Sites - The Concept of Equivalent Risk," M. R. Corn, J. H. Clarke, M. R. Groves and J. L. Pintenich, presented at the 1984 Hazardous Materials Spill Conference, Nashville, Tennessee, 1984.

"Chemical Exchange Rates Between Water and Soil," J. H. Clarke, presented at the 32nd Annual Soil Mechanics and Foundation Engineering Conference of The University of Minnesota, Minneapolis, Minnesota, 1984.

"Investigation and Remediation of the Lord/Shope Landfill," R. D. Mutch, Jr., J. Daigler, and J. H. Clarke, presented at the 1983 Conference on Management of Uncontrolled Waste Sites; Hazardous Materials Control Research Institute, Washington, D.C., 1983.

"Design of Cost-Effective Chemical Monitoring Programs for Land Disposal Facilities," J. H. Clarke, M. R. Brother, and R. D. Mutch, Jr., presented at the Third National Symposium on Aquifer Restoration and Ground Water Monitoring, Columbus, Ohio, 1983.

"Risk Assessment," presented to the New Jersey Department of Environmental Protection, Trenton, New Jersey, March 1983.

"Solidification/Stabilization Processes Appropriate to Hazardous Chemicals and Wastes Spills," B. C. Senefelder, T. F. Stancyzk, and J. H. Clarke, presented at the 1982 Conference on Hazardous Materials Spills, Milwaukee, Wisconsin, 1982.

"Attenuation of Toxic Substances in Soil Systems," presented at the National Summer Meeting of the American Institute of Chemical Engineers, Cleveland, Ohio, August 1982.

"Training Needs Assessments - Hazardous Materials and Wastes," Fourth National Workshop and Conference, National Environmental Trainers Association, Albany, New York, August 1982.

"Personnel Training Under the Resource Conservation and Recovery Act," 46th Annual Educational Conference, National Environmental Health Association, New Orleans, Louisiana, June 1982.

"Hazardous Waste Management Regulations and Treatment/Disposal Options," presented as part of a Graduate Course on Solid Waste Management at the State University of New York at Buffalo, February 1982.

"Hazardous Waste Management," Program Moderator, Sixth Annual Conference on Inland Spills, Marietta, Ohio, October 1981.

"Current Issues in Hazardous Waste Management," presented to the Department of Civil and Water Resources Engineering of the State University of New York at Buffalo, September 1981.

"Risk Assessment Techniques for Toxic Substances in the Environment," presented to the Department of Chemistry, Brock University, St. Catherines, Ontario, March 1981.

"Hazardous Materials Spill Response," presented to the College of Engineers and Architects, Condato Beach, Puerto Rico, June 1980.

"Health Effects of Hazardous Materials," presented to the National Oceanic and Atmospheric Administration (NOAA), Santa Barbara, California, 1980.

"A Methodology for Assessment of Environmental Impact of Hazardous Materials Spills and Leaching," with F. G. Ziegler, R. C. James and R. D. Harbison, The 1980 National Conference on Control of Hazardous Material Spills, Louisville, Kentucky, 1980.

"Management of Hazardous Materials Impacts on the Aquatic Environment," presented to the Department of Biology and the Environmental Biology Research Program as part of a series of seminars on Environmental Science - Water, Tennessee Technological University, Cookeville, Tennessee, 1979.

"On the Use of Mathematical Models to Identify Biological Inhibition in Aquatic Systems," with F. G. Ziegler and R. C. Young, First Venezuelan and Latin American Congress of Analytical and Experimental Toxicology, Caracas, Venezuela, 1978.

"On the Use of Mathematical Models in Water Quality Management," presented to the Department of Biology and the Environmental Biology Research Program as part of a series of seminars in Water Resources Management, Tennessee Technological University, Cookeville, Tennessee, 1978.

"The Significance of Algal Assimilation of Ammonia-Nitrogen of the Waste Assimilation Capacity of an Artificially Enriched Tidal River as Determined by N(15):Labeled Techniques," with D. S. Tennant, R. C. Young and F. G. Ziegler, presented at the 41st Annual Meeting of the American Society of Limnology and Oceanography, Victoria, British Columbia, 1978.

"A Methodology for Predicting the Impact of Waste Spills on the Biota and Water Intakes," with F. G. Ziegler, P. W. Rosten and R. C. Young, presented to the Manufacturing Chemists Association, 1977.

"On the Use of *Corbicula Fluminea* as Indicators of Heavy Metal Contamination," with A. N. Clarke, D. J. Wilson and J. F. Friauf, First International Corbicula Symposium, Fort Worth, Texas, 1977.

"The Analysis of Benthic Oxygen Demand Relationships for Wasteload Allocations," with F. G. Ziegler, R. C. Young, D. S. Tennant and P. W. Rosten, ACSE National Environmental Engineering Conference, Nashville, Tennessee, 1977.

"Modeling of a Heated Plume Discharge for Compliance with Water Quality Standards," with F. G. Ziegler, C. D. Holmes, P. W. Rosten and J. C. Batey, Waste Heat Management and Utilization Conference, Miami Beach, Florida 1977.

"Water Quality and Wastewater Management in the Rubber Processing Industry," First International Symposium on Industrial Wastes and the Environment, Caracas, Venezuela, 1976. Also served as Chairperson of the session on rubber and plastics.

"Mathematical Models and Water Resources Management," presented to the Department of Environmental and Water Resources Engineering, Vanderbilt University, Nashville, Tennessee, 1976.

"Asiatic Clam Shells as Biological Monitors of Lead," with A. N. Clarke and D. J. Wilson, 26th Southeastern Regional Meeting of the American Chemical Society, 1974.

SHORT-COURSES AND PROFESSIONAL DEVELOPMENT PROGRAMS
(Bulleted Items Indicate Sessions Taught by Dr. Clarke)

U,S. Department of Energy - Offices of Nuclear Energy and Environmental Management

Workshops on the Nuclear Fuel Cycle, 2010, 2011

- Environmental Performance Assessment

U. S. Nuclear Regulatory Commission

Workshop on Contaminated Site Decommissioning and Remediation September 2004

- The USEPA Regulations Governing Contaminated Site Investigation and Remediation
- The USEPA Approach to Risk Assessment

The Johns Hopkins University – School of Public Health

Environmental Health
Course taught annually in Prague, Czech Republic 1998 - 2001

- Overview of Hazardous Waste Site Remediation
- Conventional Remedial Technologies
- Innovative Remedial Technologies
- Risk Assessment/Risk Based Remediation

American Institute of Chemical Engineers

Chemodynamics-Transport and Fate of Chemicals in the Environment (with Dr. Louis Thibodeaux) 1981 to 1995

- Equilibrium Models
- Transport Across the Air-Water Interface
- Transport in Soils and Ground Water
- Atmospheric Dispersion Models
- Surface Water Quality Models

Center for Professional Advancement

Clean Up of Hazardous Waste Sites - Den Hague, The Netherlands

- Contaminant Transport
- Risk Assessment
- In Situ Vapor Stripping
- Emerging Technologies

Treatment of Contaminated Soils and Rock, July, 1989

- Contaminant Transport
- In Situ Vapor Stripping
- Biorestoration Approaches

Environmental Engineering and Regulatory Compliance (developed specifically for FMC Corporation Princeton, NJ) June, 1988

- Investigation and Remediation of Contaminated Structures

- Contaminant Transport
- In Situ Treatment Technologies

Remediation of Hazardous Waste Sites - 1982 to 1988

- Contaminant Transport
- In Situ Treatment Technologies
- Remediation of Contaminated Structures
- Risk Assessment

Ground Water Monitoring (Course Co-Director) - 1984-1988

- Regulatory Background
- Contaminant Transport
- Maintaining Sample Integrity

Acquisition and Interpretation of Environmental Data - 1987-1992

- Sampling Protocols For Dilute Environments
- Data Interpretation
- Statistical Tools

Environmental Compliance Audits and Due Diligence - September 1987

- General Objectives
- Site/Facility Reconnaissance
- Data Collection and Evaluation
- PCBs
- Compliance Audits - Practical Guides
- Innovative and Emerging Cleanup Technologies
- New Laboratory Approaches
- Risk Assessment

Ground Water Contamination: Detection and Monitoring - Amsterdam 1984, 1986

- Contaminant Migration in Ground Water
- Maintaining Sample Integrity
- Interpreting Ground Water Data

<u>University of Arkansas - Hazardous Materials Center</u>

Aquifer Restoration - 1987 - 1989

- Contaminant Transport
- Ground Water Treatment - Conventional and Innovative Approaches

<u>Vanderbilt University</u>

Waste Water Engineering - 1983 - 1987

- Causes and Effects of Pollutants in Aquatic Environments

Management of Leachate and Ground Water At Hazardous Waste Disposal Sites - 1983 - 1985

- Contaminant Transport
- Interpretation of Ground Water Monitoring Data

National Hazardous Materials Seminar - Series of Courses Offered from 1979 through 1981

- Mathematical Modeling - Air, Surface Water, Ground Water

University of Florida - TREEO Center

Sampling Procedures and Techniques for Field Investigations of Hazardous Waste Sites - November, 1986
- Data Interpretation
- Ground Water Sampling
- Surface Water Sampling

Aquifer Renovation: Hydrogeologic and Chemical Fundamentals - September 1986
- Contaminant Transport
- Overview of Ground Water Treatment Options
- Innovative Technologies for Ground Water Treatment

Ground Water Contamination Assessment - July, 1986
- Sample Collection
- Interpretation of Ground Water Data
- Contaminant Transport

New York Department of Environmental Conservation

Sampling Techniques and Procedures for Field Investigations - Series of courses offered from 1983 through 1986
- Chemical Properties
- Site Reconnaissance
- Maintaining Sample Integrity
- Surface Water Sampling

Ground Water Contamination Assessment - 1981
- Contaminant Transport
- Design of Ground Water Monitoring Networks

U. S. Environmental Protection Agency

Hazard Evaluation and Environmental Assessment - Series of courses offered from 1981 through 1983
- Behavior of Hazardous Chemicals in Soil
- Meteorology
- Atmospheric Dispersion Modeling

MENTORING OF STUDENTS AND ENVIRONMENTAL ENGINEERS AND SCIENTISTS

GRADUATE STUDENTS

Kevin M. Kostelnik, Ph.D. in Environmental Management – May 2005
Kevin G. Brown, Ph.D. in Environmental Engineeing – May 2008
Leah Spradley, Ph.D. in Environmental Management –May, 2008
Brooke N. Traynham, Ph.D. Environmental Science Option in Environmental Engineering-May 2010
Bruce Hallbert Ph.D. Environmental Management-December 2010
Ravi Pakolodeti, Ph.D. in Environmental Engineering – anticipated May 2012
Joe Rustick, Ph.D. in Environmental Engineering – anticipated December 2012
Roneisha Worthy, Ph.D. in Environmental Management – anticipated December 2012

Vindi N'dulutte, M.S. in Environmental Engineering – August 2005
George Cunningham, M.Eng. in Environmental Engineering – December 2005
Carrie Stokes, M. Eng. In Environmental Engineering –December 2006
Paul Padgett, M.S.. in Environmental Engineering –December 2007
Maria Takahashi, M.S. in Environmental Science, December 2008

Meghan Higby, M. Eng. In Environmental Engineering – May 2009
Jonathan Hardin, M. Eng. In Environmental Engineering – May 2009
Janette Peters, M. Eng. In Environmental Engineering –December 2009
Chris Pianta, M. Eng. In Environmental Engineering –May 2010
Ben George, M.S. in Environmental Science –May 2010
Stacey Worman, M.S.. in Environmental Science – December 2010

STUDENT ACTIVITIES

Faculty Advisor to the Vanderbilt Student Chapter of the American Nuclear Society
Faculty Advisor to the Vanderbilt Biodiesel Initiative