James H. Clarke

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Sustainable Environmental Protection, Performance Assessment of Waste Management Systems, Long Term Management and Monitoring of Legacy Radioactive and Hazardous Chemical Waste Sites, Environmental Forensics
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General Interests
Jim is a Professor of the Practice in the Department of Civil and Environmental Engineering and Director of Graduate Studies for Environmental Engineering. He is also a Professor in Earth and Environmental Sciences. Prior to joining the full-time faculty of Vanderbilt, Jim spent 25 years in private practice with an international environmental consulting and engineering firm. For 14 of these years he served as Chairman, President and CEO.

Jim's research is focused primarily on several topics within the broad area of environmental management and decision-making and includes investigation and remediation of contaminated sites, risk analysis, performance assessment for contamination isolation systems and monitoring and management of remediation end states for legacy radioactive and hazardous chemical waste sites.

Jim is a former member of the Nuclear Regulatory Commission (NRC) Advisory Committee on Nuclear Waste and Materials and a consultant to the NRC Advisory Committee on Reactor Safeguards. He serves as a peer reviewer for the Department of Energy, the Environmental Protection Agency, the Nuclear Regulatory Commission, the National Academies and several journals and book publishers.

Current Research
Jim and his students are currently working on the major challenges associated with technology evaluation, performance assessment and long term monitoring and management for engineered contaminant isolation systems of hazardous chemical and radioactive waste and materials. This research includes data evaluation and the use of predictive mathematical models to
forecast performance with the objective of using post construction monitoring data and other information to improve and build confidence in the assessment tools that are being used. The goal in all of this work is the development of risk-informed and performance based approaches and decision-making.

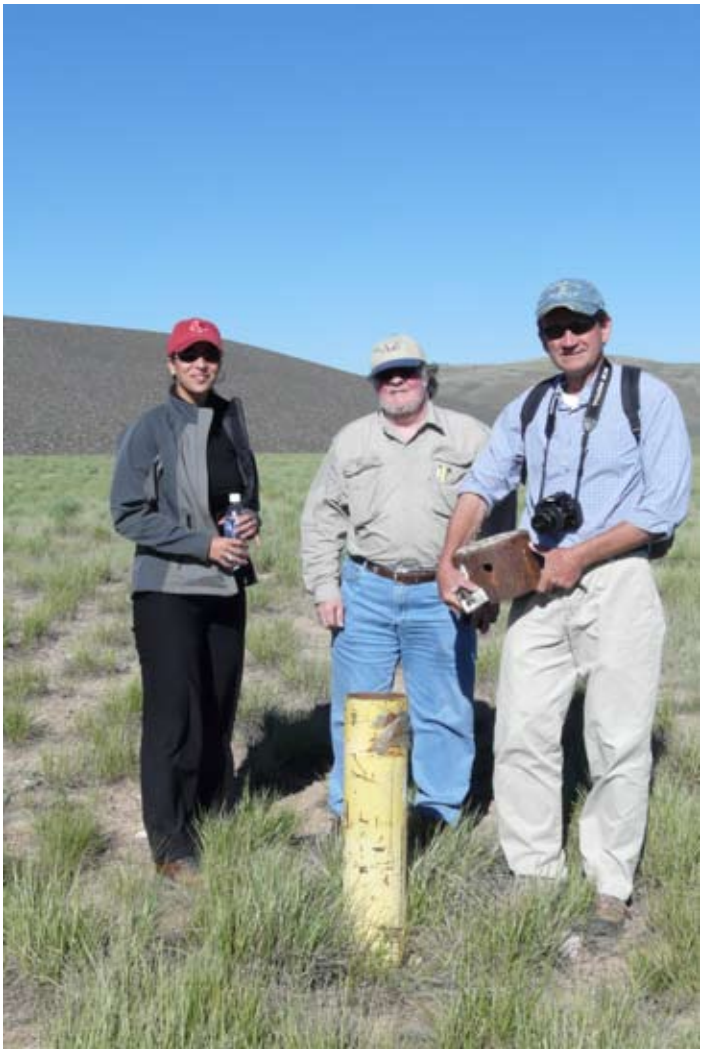
Specific projects include:

- development of a modeling framework for the transport of contaminants across the ground water-surface water interface
- the use of ecological assessment and monitoring to improve performance assessment and post construction performance confirmation
- determinations of best practices for performance assessments of waste management and environmental remediation technologies and site-specific applications
- risk management decision-making for the remediation and closure of mining sites
- modeling of contaminant transport within phytoremediation systems
- quantitative evaluations of ways in which individual behaviors affect potential carbon emissions and climate change.

In all of this work, Jim and his students strive to improve the sustainability of the technology and the remediation and long-term management approach ("Green environmental management").

Courses Taught
Jim is the lead instructor for graduate and undergraduate courses on Environmental Assessments, Environmental Characterization and Analysis, and Technology and Environment. He is also an invited lecturer in courses on Safety, Security and Environmental Risk Management, Health Physics and Radiological Aspects of Environmental Engineering and in seminars on Energy and Environment. Jim served as the lead instructor for the Environmental Science Capstone Course on Deep Geologic Disposal of Nuclear Waste (The Yucca Mountain Project), and serves on the faculty charged with development and implementation of future Capstone Courses.

What Students Do
Jim is a primary research director and co-director for several students pursuing graduate degrees in Environ-mental Science, Engineering and Management. His students perform applied research designed to advance environmental management approaches and technologies. They participate in site visits and field reviews to see first-hand and learn about current cutting edge approaches and work as interns with selected Federal Agencies and Programs. Students are encouraged to present papers at major conferences and publish manuscripts in the leading peer-reviewed journals as part of their dissertation activities.



Brooke Traynham (Ph.D. candidate), Jim and Jody Waugh (Stoller Corporation) view a groundwater monitoring well for the uranium mill tailings site at Gunnison, CO.

Selected Publications (*student)

Traynham B*, J. H. Clarke, Burger, W. J. Waugh 2008, Monitoring the Long-Term Performance of Engineered Containment Systems: Mitigating Ecological Risks, Annual Meeting of the Society for Risk Analysis.

Spradley*, L. L. M. Abkowitz and J. H. Clarke 2008, An Integrated Tool for Evaluating Pre-Closure Operational Performance of the Yucca Mountain Waste Management System, Manuscript accepted in Nuclear Technology.

Clarke, J. H. and F. L. Parker, 2008. "Uranium Recovery and the Remediation of Uranium Mill Tailings-Russian and United States Experience, proceedings of a workshop on Cleaning Up Sites Contaminated with Radioactive Materials, sponsored by the U. S. Academy of Sciences and the Russian Academy of Sciences, Moscow Russia.

Traynham, B.*, J H. Clarke and J. Burger 2008, Monitoring the Long Term Performance of Engineered Containment Systems: What Can We Learn from Ecological Monitoring Approaches?, Waste Management 08, Phoenix, AZ .

Kostelnik, K. M*. and J H. Clarke, 2008. "Managing Residual Contamination-Reuse and Isolation Case Studies", Remediation, Spring 2008, pp 75-97.

Padgett, J. P.*, A. C. Steinemann, J. H. Clarke and M. P. Vandenbergh, 2008, "A Comparison of Carbon Calculators", Environmental Impact Assessment Review, v. 28 pp 106-115.

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

Clarke, J. H. 2007, Thoughts on Education and the Nuclear Rennaissance: 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.

Chien, C., H. I. Inyang and L. G. Everett 2006. Barrier Systems for Contaminant Containment and Treatment, contributor to Chapter One, CRC Press.

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

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

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

Interim cover for the Maxey Flats low level radioactive waste site in KY.