M. John Plodinec
Curriculum Vita

Education
Ph.D., Physical Chemistry, 1974
University of Florida
Gainesville, FL

B.A., Chemistry, 1968
Franklin and Marshall College
Lancaster, PA

Summary

Dr. Plodinec is an internationally recognized expert in nuclear waste characterization and disposition. During his involvement over more than two decades with the Department of Energy's Defense Waste Processing Facility (DWPF) - the United States' first and the free world's largest radioactive waste vitrification facility - Dr. Plodinec had an impact on every aspect of the DWPF process, from characterization of the waste to proof testing of the canister closure to ensure leaktightness. Dr. Plodinec was also the primary technical lead for the DWPF product qualification program. He personally managed the $40 million dollar DWPF product qualification program within the Savannah River National Laboratory. In this latter role, Dr. Plodinec had responsibility for achieving concurrence from the regulatory community, and acceptance by the public.

Dr. Plodinec also prepared the technical case that led the US Environmental Protection Agency to declare vitrification to be the Best Demonstrated Available Technology for HLW, and for heavy metals. He was named to the Department of Energy's Tanks Focus Area, and co-ordinated waste immobilization programs across the DOE complex, and internationally. He was the Department of Energy's primary author for the Waste Acceptance Product Specifications, which govern all of the HLW glass products produced in the US. He is regularly consulted by several of the DOE sites (e.g., Hanford, Idaho, Fernald, Oak Ridge), by DOE headquarters, and by external groups such as the Defense Nuclear Facilities Safety Board, and the National Academies of Science and Engineering, currently serving as Vice Chair of a Committee performing an independent assessment of the science and technology supporting the Department of Energy's Defense Environmental Cleanup Program.

Dr. Plodinec's ability to coordinate technical programs has also served him well in the international arena. He organized a team from Argentina, SRNL, and ORNL to demonstrate the destruction of reactor ion exchange resins via vitrification. This was the first project initiated under the US-Argentina Technical Exchange agreement negotiated in 1996, and arguably the most successful. Dr. Plodinec also headed up a team helping the Indian glass and metal foundry industries to convert to natural gas from coal to prevent further deterioration of the Taj Mahal in India. As part of a NATO-sponsored team, he prepared recommendations that have been followed by the government of Estonia in cleaning up the Sillamae site, reputedly the most

contaminated site in Europe.

Dr. Plodinec has led subgroups as part of the "Best and Brightest" reviews of the Waste Treatment Plant and the Demonstration Bulk Vitrification System, sponsored by DOE-HQ. He reviewed test plans for both groups aimed at resolving the issues uncovered by these comprehensive reviews. In 2006 and 2007, he organized and led a distinguished panel reviewing hydrogen generation during processing of SRS HLW in the DWPF. He also participated in preparation of DOE-EM's technology roadmap in 2006.

Since 2008, Dr. Plodinec has been the technical lead for the activities undertaken by the Community and Regional Resilience Institute. In this role, he is responsible for identifying and evaluating technologies useful for enhancing a community's ability to anticipate emergencies and disruptions, limit their impacts, effectively respond to them and rapidly recover from them. He was the technical lead for the development of CARRI's Community Resilience System and its Campus Resilience Enhancement System. His most important contribution to these efforts has been development of action-oriented tools that operationalize the "Whole Community" concept for both communities and college campuses.

Dr. Plodinec also developed CARRI's Resilient Home Program, aimed at improving the survivability of American homes to natural disasters. This built on earlier work he did while at Mississippi State University, where he led the University's efforts to develop programs related to severe weather events. He is the author of a chapter in McGraw-Hill's latest Encyclopedia of Homeland Security dealing with implementation of Whole Community efforts.

Dr. Plodinec coordinated development of an action plan for management of woody biomass and debris generated by disasters produced by the federal government's Woody Biomass Working Group. This effort required input, review and approval by seven federal agencies (Departments of Energy, Agriculture, and Interior, the EPA, the US Forest Service, FEMA, and the Corps of Engineers) as well as coordination with state governments in the southeastern US, and other major stakeholders in the American forest enterprise. As part of a joint program with the International Code Council, Target Corporation, AECOM, Kaiser Permanente and other partners, he is leading development of a Community Resilience Benchmark System.

Professional positions

2017-2018. Vice Chair, National Academies of Science and Engineering Committee assessing science and technology supporting DOE-EM's nuclear waste cleanup program.

2016-present. Technical Director, Alliance for National and community Resilience.

2016-2018. Chair, Social and Economic Committee, Community Resilience Panel, National Institute of Standards and Technology.

2013. Participated in a review of process engineering at the Defense Waste Processing Facility.

2008-present. Associate Director, Resilience Technologies, Community and Regional Resilience Institute, Oak Ridge, TN.

2007-2008. Vitrification Team Lead, Demonstration Bulk Vitrification System Expert Review Panel.

2006-2008. Technology Lead, Waste Treatment Plant Expert Review Panel.

2005-2010. Science Advisor, Savannah River National Laboratory, Aiken, SC.

2003-2004. Member of National Academies of Science and Engineering panel which produced report "Improving the Characterization Program for Contact-Handled Transuranic Waste Bound for DOE's Waste Isolation Pilot Plant."

2001-2002. Member of National Academies Of Science and Engineering panel which produced report "Characterization of Remote-Handled Transuranic Waste for the Waste Isolation Pilot Plant: Final Report."

2003-2005. Principal scientist in the Southeastern Regional Carbon Sequestration Partnership, under the leadership of the Southern States Energy Board. Responsible for developing/evaluating measurement-monitoring-verification technologies for the partnership.

2002-2005. Representative of State of Mississippi on University Advisory Board of the Energy Council.

2002-04. PI for project assisting Indian glass and metal foundry industries to convert to natural glass from coal.

2002-04. PI for feasibility study on use of poultry litter and wood waste for power and products.

2001-03. Technology lead for the State of Mississippi's Alternative Energy Enterprise. Responsible for technology programs, primarily in the area of biomass to energy.

1998. Advisor to Estonian government on clean-up of contaminated site at Sillamae, Estonia.

1997-2005. Director of Diagnostic Instrumentation and Analysis Laboratory, Mississippi State University, Starkville, MS.

1994-97. Technology Integration Manager for Immobilization for DOE's Tanks Focus Area. Responsible for coordinating high-level nuclear waste programs for entire Department of Energy complex.

1989-97. Manager and Senior Advisory Scientist, Westinghouse Savannah River Co., Aiken, SC, in charge of Glass Technology Group, optimizing radioactive and chemically hazardous waste vitrification processes and products. Primary concentration on waste characterization, process control, and consistently achieving glass durability.

1980-89. Various supervisory positions with E. I. DuPont de Nemours, Aiken, SC, Savannah River Laboratory (SRL), in charge of Glass Technology Group.

1976-80. Research scientist, SRL, providing basic data on high-level waste vitrification for multi-billion dollar plant.

1974-76. Research scientist, SRL, various waste management projects, and study of flocculants for actinide separations.

1968-69, 1971-74. Graduate student, University of Florida, in physical chemistry.

1969-71. US Army, interrogation of POWs in Republic of Viet Nam.

Conferences

Co-organizer, Resilient Forests and Forest Products Industries Summit, 2008.

Program Chair, Spectrum 1994.

Selected Honors

Awarded over $200 million in research funding over course of career.

NATO Fellowship, 1998, to assist in cleanup of Sillamae site in Estonia..

Elected Fellow, American Ceramic Society, 1996.

Awarded Bronze Star with two Oak Leaf clusters, US Army, 1971.

Selected presentations

Invited presentation, *Community Resilience: A Systems Perspective*, 8th Asian-Pacific Programme for National Security Officers, 2014.

Presentation on results of initial phase of testing of the Community Resilience System, IAEM Annual Meeting, 2012.

Presentation, *The Community Resilience System - Enhancing Community Resilience*, Resilience 2011.

Webinar, *Community Resilience: Strategies to Weather the Bad Times, Thrive in the Good Times*, International City/County Management Association, 2011.

Webinar, *Community Resilience*, Southern Growth Policies Board, 2011.

Invited presentation on *Incentive & Disincentive Programs that Encourage Risk Mitigation & Resilience*, McGraw-Hill Conference on Mitigating Disaster through Design and Construction, 2010.

Invited presentation on *Bases of the Community Resilience System* at the First International Symposium on Societal Resilience, 2010.

Invited presentation, *Five Aphorisms and an Epilogue*, New Orleans Resiliency Summit, 2010.

Invited presentation at Department of Homeland Security's Workshop on Community Resilience, 2009.

Invited presentation, *From Policy to Practice (and Back Again): Promoting Economic Resilience*, First Economic Development Agency Research Symposium, 2009.

Webinar, *The Global Warming Debate - Engineers Needed!,* American Institute of Chemical Engineers, 2009.

Invited presentation, *Resilient Home Program-Coalition of the Willing*, Charleston, SC, 2008.

Invited testimony to NRC's Advisory Committee on Nuclear Waste, characterization of residues in radwaste tanks, 2007.

Invited testimony to Defense Nuclear Facilities Safety Board on characterization of HLW at Hanford, 2001; and plutonium vitrification, 1997.

Invited testimony to Nuclear Waste Technical Review Board on waste characterization, 1996; and on waste form qualification programs, 1986, 1989 and 1990.

Invited presentation to National Academies' Board on Radioactive Waste Management on vitrification technologies, 1985.

Book chapters

1. M. J. Plodinec, *The Community Resilience System: Operationalizing a Whole Community Approach*, in McGraw-Hill **2012 Homeland Security Handbook**. New York: McGraw-Hill, 2012; Chapter 35.

2. M. J. Plodinec, *Bases for a Community Resilience System*, in **Proceedings of the First International Symposium on Societal Resilience** (held December, 2010), Alex McLellan and Meir Elran (eds). Fairfax, VA: Homeland Security Studies and Analysis Institute, 2012; 201-26.

Selected Articles (from over 250 scholarly articles and government research reports)

M. J. Plodinec, "A practitioner's model of community resilience." Proceedings – 5th International Conference on Building Resilience (2015).

M. J. Plodinec, Alicia GB Smith, "Failing to plan is planning to fail: chemical spill in West Virginia." **Natural Hazards Observer, XXXVIII (4)**, (March, 2014).

M. J. Plodinec, "College Campuses: Catalyst for Community Resilience," 2014. Available at www.resilientus.org/publications/carri-special-reports/cares-report-ihe-impacts-on-communities-

final-2/.

Plodinec, M. John, Warren C. Edwards, and Robin K. White. "Applications of a "Whole Community" Framework for Enhancing Community or Campus Resilience." **Procedia Economics and Finance**, **18**, 9-16 (2014).

M. J. Plodinec, "It's in There: A Comparison of the Campus Resilience Enhancement System (CaRES) to the Federal Guide for Developing IHE Emergency Operations Plans, 2013. Available at http://www.resilientus.org/wp-content/uploads/2015/04/Its-In-There.pdf.

White, Robin K., Warren C. Edwards, Ann Farrar, and M. John Plodinec. "A Practical Approach to Building Resilience in America's Communities." **American Behavioral Scientist, 59** (2), 200-19 (2014).

M. John Plodinec, **College Campuses: Catalysts for Community Resilience.** Community and Regional Resilience Institute (2014). Accessed through http://www.resilientus.org/publications/carri-special-reports/cares-report-ihe-impacts-on-communities-final-2/.

Fengxiang X. Han, Roger L. King, Jeffrey S. Lindner, Tzu-Yi Yu, Surya S. Durbha, Nicolas H. Younan, David L. Monts, Yi Su, John C. Luthe, M. John Plodinec, "Nutrient fertilizer requirements for sustainable biomass supply to meet U.S. bioenergy goal." **Biomass and Bioenergy, 35,** 253-62 (2011).

M. J. Plodinec (ed), "Action Plan for Damaged Timber and Woody Debris Management," 2010. Available at www.windwoodutilization.org/pdf/action_plan.pdf.

M. John Plodinec, **Definitions of Resilience-An Analysis**. Community and Regional Resilience Institute (2009). Accessed through http://www.resilientus.org/about-us/definition-of-community-resilience.html, October 1, 2012.

Jantzen, Carol M., Daniel I. Kaplan, Ned E. Bibler, David K. Peeler, and M. John Plodinec. "Performance of a buried radioactive high level waste (HLW) glass after 24 years." *Journal of Nuclear Materials* 378, no. 3 (2008): 244-256.

Fengxiang X. Han, M. John Plodinec, Yi Su, David L. Monts and Zhongpei Li, "Terrestrial carbon pools in southeast and south-central United States." **Climatic Change, 84,** 191-202 (2007).

Z.P. Lia, F.X. Han,Y. Su, T.L. Zhang, B. Sun, D. L. Monts, M.J. Plodinec, "Assessment of soil organic and carbonate carbon storage in China." **Geoderma, 138,** 119-26 (2007).

M. J. Plodinec, "Pick Your Poison-Natural Gas Uncertainties and the American Glass Industry." **Bulletin of the American Ceramics Society, 85**, 32-5 (2006).

Chuji Wang, John Plodinec, **Breath Gas Analyzer for Diagnosing Diabetes and Method of Use Thereof**, US Patent Application 10/340,602 (2003).

Fengxiang X. Han, Yi Su, David L. Monts, M. John Plodinec, Amos Banin and Glover E. Triplett, "Assessment of global industrial-age anthropogenic arsenic contamination." **Naturwissenschaften, 90**, 395-401 (2003).

Fengxiang X. Han, Amos Banin, Yi Su, David L. Monts, M. John Plodinec, William L. Kingery and Glover E. Triplett, "Industrial age anthropogenic inputs of heavy metals into the pedosphere." **Naturwissenschaften, 89**, 497-504 (2002).

M. J. Plodinec, "Borosilicate glasses for nuclear waste immobilisation." **Glass Technology, 41,** 186-92 (2000).

Plodinec, M., & Wicks, G. (1993). Applicatons of Hydration Thermodynamics to In-Situ Test Results. *MRS Proceedings, 333*. doi:10.1557/PROC-333-145.

M. J. Plodinec and C. M. Jantzen, "Thermodynamic model of natural, medieval and nuclear waste glass durability." **Journal of Non-Crystalline Solids, 67**, 207-223 (1984).