

GEORGETA RADULESCU, Ph.D.

Oak Ridge National Laboratory
P.O. Box 2008, Bldg. 5700
Oak Ridge, TN 37831-6170
Phone: 865-241-9998
E-mail: radulescug@ornl.gov

SUMMARY

Nuclear engineer (Ph.D.) with more than twenty years of work experience; expertise in performing, documenting, and reviewing complex radiation shielding analyses and depletion and criticality code validations for burnup credit criticality safety analyses.

EDUCATION

THE UNIVERSITY OF TEXAS AT AUSTIN, AUSTIN, TX

Doctor of Philosophy in Nuclear Engineering, May 2003

Dissertation title: *Automated Variance Reduction for Monte Carlo Shielding Analyses with MCNP*

Master of Science in Nuclear Engineering, August 1997

Thesis title: *MCNP Criticality Benchmarks for Mixed Oxide Lattices of the Saxton Plutonium Program*

UNIVERSITY OF BUCHAREST, ROMANIA

Master of Science in Engineering Physics, June 1986

Bachelor of Science in Engineering Physics, June 1985

WORK EXPERIENCE

08/2005–present

OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TN

Reactor and Nuclear Systems Division – Radiation Transport Group

Research and Development Staff

Major areas of work include depletion and criticality code validations for criticality safety analyses employing burnup credit and shielding analyses for commercial spent nuclear fuel (SNF) packages. Specific accomplishments include:

- Evaluated the consequence of the failure of high-burnup fuel on the safety of spent nuclear fuel transportation packages with respect to shielding and containment.
- Performed SCALE/TRITON depletion code validation in terms of a reactivity difference for high capacity commercial SNF pool storage racks and transportation packages to provide technical basis and recommendations for NRC regulatory guidance on validating actinide and fission product burnup credit criticality safety analyses (ISG-8, Rev. 3).
- Contributed to the development of benchmark specifications for the OECD/NEA Expert Group on Burn-up Credit Criticality Safety benchmark phase VII titled “UO₂ Fuel Study of Spent Fuel Compositions for Long-term Disposal,” analyzed the calculation results submitted by the participants to the benchmark exercise, and prepared the OECD/NEA technical report describing the benchmark calculations and results.

WORK EXPERIENCE (continued)

- Completed criticality and depletion analysis method validations for burnup credit disposal criticality analyses in support of US DOE's License Application for the proposed high-level waste geologic repository at Yucca Mountain, Nevada.
- Performed SCALE/TRITON depletion code validations based on comparison of measured and calculated nuclide concentrations.
- Demonstrated the applicability of commercial reactor criticals to criticality code validations for burnup credit criticality safety analyses of commercial SNF casks using SCALE/TSUNAMI cross section sensitivity and uncertainty analysis techniques.
- Generated reference data for determining production rates of corrosive radiolysis products that affect long-term performance of high-level waste engineered barriers.
- Performed confirmatory dose rate calculations for US EPR to assist the NRC staff in determining the technical adequacy of design certification applications radiation shield design.
- Serves as code manager and developer of STARBUCS, the SCALE sequence for automated criticality safety analyses using burnup credit.

02/2001–08/2005

BECHTEL SAIC COMPANY, LAS VEGAS, NV

DOE Office of Civilian Radioactive Waste Management (OCRWM) Yucca Mountain Project

Senior Engineer

Areas of work include radiation source term, dose rate, and shielding design calculations for surface and subsurface facilities at the proposed high-level waste geologic repository at Yucca Mountain, Nevada, in support of License Application. Applied project requirements and design criteria to demonstrate compliance with the regulatory requirements of 10 CFR Parts 20 and 63. Specific accomplishments include:

- Shielding design calculations to establish shielding requirements for the various structure components of the Fuel Handling Facility, Dry Transfer Facility, Remediation Facility, and Canister Handling Facility.
- SNF aging area configuration optimization studies to minimize dose rates to workers and members of the public.
- Optimization studies of waste emplacement turnout-drift geometry to minimize dose rates in access areas.
- Dose rate calculations to characterize radiation levels for subsurface repository areas.
- Calculation of direct radiation exposures from postulated Category 1 and 2 event sequences for preclosure repository operations.
- Source term generation for low level waste such as HVAC filters, ion exchange resins, and dry active waste that would result from repository operations.

07/1998–02/2001

FRAMATOME COGEMA FUELS, LAS VEGAS, NV

DOE OCRWM Yucca Mountain Project

Engineer

Performed detailed dose rate evaluations for various high-level waste packages including commercial SNF waste packages, codisposal high-level waste, and DOE-owned SNF (e.g., Fast Flux Test Facility, TRIGA, Enrico Fermi, Fort St. Vrain, and Shippingport reactor fuels) waste packages.

WORK EXPERIENCE (continued)

09/1995–06/1998

THE UNIVERSITY OF TEXAS AT AUSTIN, AUSTIN, TX
Department of Mechanical Engineering

Graduate Research/Teaching Assistant

Performed criticality benchmark evaluations for the Saxton Plutonium Critical Experiments in support of the joint US/Russia project titled “Neutronics Benchmarks for the Utilization of Mixed-Oxide Fuel.”

08/1986–08/1995

INSTITUTE FOR NUCLEAR RESEARCH, PITESTI, ROMANIA
TRIGA Reactor Division

Research Scientist

Performed reactor and gamma irradiation facility gamma heat distribution measurements, and radiation source term and shielding design calculations for 14-MW TRIGA and CANDU SNF transport casks.

PUBLICATIONS

Ph.D. Dissertation

G. Radulescu, “Automated Variance Reduction for Monte Carlo Shielding Analyses with MCNP,” *Ph.D. Dissertation*, The University of Texas at Austin (May 2003).

M.S. Thesis

G. Radulescu, “MCNP Criticality Benchmarks for Mixed Oxide Lattices of the Saxton Plutonium Program,” *M.S. Thesis*, The University of Texas at Austin (May 1997).

Technical Reports

G. Radulescu, I. C. Gauld, G. Ilas, and J. C. Wagner, *An Approach for Validating Actinide and Fission Product Burnup Credit Criticality Safety Analyses—Isotopic Composition Predictions*, NUREG/CR-7108 (ORNL/TM-2011/509), prepared for the US Nuclear Regulatory Commission by Oak Ridge National Laboratory, Oak Ridge, TN (2012).

G. Radulescu and J. C. Wagner, *Burn-up Credit Criticality Safety Benchmark Phase VII, UO₂ Fuel: Study of Spent Fuel Compositions for Long-term Disposal*, ISBN 978-92-64-99172-9, Nuclear Energy Agency, Organisation for Economic Co-Operation and Development (2012).

G. Radulescu, *Radiation Transport Evaluations for Repository Science*, ORNL/LTR-2011/294, Oak Ridge National Laboratory, Oak Ridge, TN (2011).

PUBLICATIONS (continued)

I. C. Gauld, G. Ilas, and G. Radulescu, *Uncertainties in Predicted Isotopic Compositions for High Burnup PWR Spent Nuclear Fuel*, NUREG/CR-7012 (ORNL/TM-2010/41), prepared for the US Nuclear Regulatory Commission by Oak Ridge National Laboratory, Oak Ridge, TN (2011).

G. Radulescu, *Propagation of Isotopic Bias and Uncertainty to Criticality Safety Analyses of PWR Waste Packages*, ORNL/TM-2010/116, Oak Ridge National Laboratory, Oak Ridge, TN (2010).

G. Radulescu, I. C. Gauld, and G. Ilas, *SCALE 5.1 Predictions of PWR Spent Nuclear Fuel Isotopic Compositions*, ORNL/TM-2010/44, Oak Ridge National Laboratory, Oak Ridge, TN (2010).

G. Radulescu, D. E. Mueller, and J. C. Wagner, *Sensitivity and Uncertainty Analysis of Commercial Reactor Criticals for Burnup Credit*, NUREG/CR-6951 (ORNL/TM-2006/87), prepared for the US Nuclear Regulatory Commission by Oak Ridge National Laboratory, Oak Ridge, TN (2007).

G. Radulescu, D. E. Mueller, S. Goluoglu, D. F. Hollenbach, and P. B. Fox, *Range of Applicability and Bias Determination for Postclosure Criticality of Commercial Spent Nuclear Fuel*, ORNL/TM-2007/127, Oak Ridge National Laboratory, Oak Ridge, TN (2007).

G. Radulescu, *Evaluation of the Relative Power Experiments for the Saxton Partial Plutonium Core*, ORNL/SUB/99-XSZ175V-4, Oak Ridge National Laboratory, Oak Ridge, TN (2001).

N. M. Abdurrahman, I. Carron, and G. Radulescu, *Neutronics Benchmarks for the Utilization of Mixed-Oxide Fuel: Saxton Critical Experiments*, ORNL/SUB/00-XSZ175V-2, Oak Ridge National Laboratory, Oak Ridge, TN (2000).

Journal Articles, Full-Length Topical Papers, and Conference Summaries

G. Radulescu, I.C. Gauld, G. Ilas, and J. C. Wagner, "Approach for Validating Actinide and Fission Product Compositions for Burnup Credit Criticality Safety Analyses," to be published in *Nucl. Technol.*

J. M. Scaglione, G. Radulescu, K. R. Robb, W. J. Marshall, J. C. Wagner, M. Flanagan, M. Aissa, and Z. Li, "Consequence Analysis of Spent Nuclear Fuel Reconfiguration Scenarios," PATRAM 2013, San Francisco, CA, August 18-23, 2013.

J. M. Scaglione, R. A. Lefebvre, G. Radulescu, H. J. Smith, D. Ilas, K. R. Robb, J. C. Wagner, H. E. Adkins, T. E. Michener, and D. Vinson, "Integrating Data and Analysis Capabilities for Cask-Specific Safety Evaluations," *Proc. of the 14th International High-Level Radioactive Waste Management Conference*, Albuquerque, NM, April 28 – May 2, 2013.

J. M. Scaglione, A. Caswell, J. B. Clarity, and G. Radulescu, "Considerations for an Integrated Storage, Transportation, and Disposal Canister," *Proc. of the 14th International High-Level Radioactive Waste Management Conference*, Albuquerque, NM, April 28 – May 2, 2013.

A.M. Bevill, G. Radulescu, J. M. Scaglione, and R. L. Howard, "ADVANTG Shielding Analysis for Closure Operations in an Open-Mode Repository," *Proc. of the 14th International High-Level Radioactive Waste Management Conference*, Albuquerque, NM, April 28 – May 2, 2013.

G. Ilas, I. C. Gauld, and G. Radulescu, "Validation of new depletion capabilities and ENDF/B-VII data libraries in SCALE," *Annals of Nuclear Energy*, **46**, 43–55 (2012).

G. Radulescu, I. C. Gauld, G. Ilas, and J. C. Wagner, "An Approach for Validating Actinide and Fission Product Burnup Credit Criticality Safety Analyses-Isotopic Composition Predictions," *Proc. of the 9th International Conference on Nuclear Criticality Safety (ICNC 2011)*, Edinburgh, United Kingdom, September 19–22, 2011.

I. C. Gauld, G. Radulescu, G. Ilas, B. D. Murphy, M. L. Williams, and D. Wiarda, "Isotopic Depletion and Decay Methods and Analysis Capabilities in SCALE," *Nucl. Technol.*, **174**, 169–195 (2011).

G. Radulescu and J. C. Wagner, "Review of Results for the OECD/NEA Phase VII Benchmark: Study of Spent Fuel Compositions for Long-Term Disposal," *Proc. of the International High-Level Radioactive Waste Management Conference*, Albuquerque, NM, April 10–14, 2011.

G. Radulescu and E. D. Blakeman, "Iodine-125 Brachytherapy Seed Benchmark," *Proc. American Nuclear Society Radiation Protection and Shielding Division 2010 Topical Meeting*, Las Vegas, NV, April 18–23, 2010.

G. Radulescu and I. C. Gauld, "Evaluation of PWR Isotopic Composition Data," *Trans. Am. Nucl. Soc.*, **101**, 688 (2009).

I. C. Gauld, G. Radulescu, and G. Ilas, "SCALE Validation Experience Using an Expanded Isotopic Assay Database for Spent Nuclear Fuel," *Proc. of the IAEA/CSN International Workshop on Advances in Applications of Burnup Credit for Spent Fuel Storage, Transport, Reprocessing, and Disposition*, Cordoba, Spain, October 27–30, 2009.

G. Radulescu and I. C. Gauld, "Enhancements to the Burnup Credit Criticality Safety Analysis Sequence in SCALE," *Proc. of the 2009 Nuclear Criticality Safety Division Topical Meeting on Realism, Robustness and the Nuclear Renaissance*, Richland, WA, September 13–17, 2009.

G. Radulescu, D. E. Mueller, and J. C. Wagner, "Sensitivity and Uncertainty Analysis of Commercial Reactor Criticals for Burnup Credit," *Nucl. Technol.*, **167(2)**, 268–287 (2009).

G. Radulescu, D. E. Mueller, and J. C. Wagner, "Evaluation of Applicability of CRC Models for Burnup Credit Validation," *Trans. Am. Nucl. Soc.*, **97**, 151 (2007).

G. Radulescu and S. Su, "Dose Rate Evaluation for Spent Fuel Aging Areas at Yucca Mountain," *Trans. Am. Nucl. Soc.*, **92**, 29 (2005).

G. Radulescu and J. S. Tang, "Shielding Evaluations of Waste Package Designs," *Proc. of the 12th Biennial RPSD Topical Meeting*, Santa Fe, NM, April 14–18, 2002.

J. S. Tang and G. Radulescu, "Radiolytic Production of Nitric Acid Outside a 21-PWR Waste Package," *Proc. of the 12th Biennial RPSD Topical Meeting*, Santa Fe, NM, April 14–18, 2002.

G. Radulescu, J. S. Tang, and T. W. Doering, "Evaluation of the Effect of Source Geometry Models on Dose Rates of Waste Packages." *J. Nucl. Sci. Tech.*, Supplement 1, 320–323 (2000) (9th International Conference on Radiation Shielding, Tsukuba, Japan, 17–22 Oct. 1999).

N. M. Abdurrahman, G. Radulescu, and I. Carron, "Benchmark Calculations for Critical Experiments of the Saxton Plutonium Program," *Nucl. Technol.*, **127**, 315–331 (1999).

G. Radulescu and N. M. Abdurrahman, "Benchmark Calculations for Relative Power Experiments of the Saxton Plutonium Critical Experiments," *Trans. Am. Nucl. Soc.*, **78**, 250 (1998).

N. M. Abdurrahman, M. Yavuz, and G. Radulescu, "MCNP Analysis of PNL Split-Table Critical Experiments Containing Mixed-Oxide Fuels," *Trans. Am. Nucl. Soc.*, **77**, 213 (1997).

G. Radulescu and N. M. Abdurrahman, "MCNP Criticality Calculations of the Saxton Plutonium Program Experiments," *Trans. Am. Nucl. Soc.*, **76**, 231 (1997).