JOEL M. RISNER

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CAREER SUMMARY

More than 25 years of experience in radiation shielding and reactor physics analysis, primarily at Bettis Atomic Power Laboratory and Oak Ridge National Laboratory. Major areas of experience include deterministic and Monte Carlo radiation transport analyses, development and qualification of new radiation shielding design methods and cross-section libraries, and development of new data analysis and visualization techniques. Recent applications of hybrid radiation transport methods to diverse shielding applications. Extensive experience in mentoring, teaching, technical presentations, and technical writing and editing.

EDUCATION

M.S. in Nuclear Engineering, Kansas State University — August, 1986
B.S. in Nuclear Engineering, Kansas State University — August, 1983

Graduate-level courses at the Bettis Reactor Engineering School in math, statistics, nuclear physics, reactor theory, reactor kinetics, radiation shielding, and engineering materials.

EXPERIENCE

January 2010 – Present
Senior Research and Development Staff, Oak Ridge National Laboratory, Oak Ridge, TN

- Perform Monte Carlo and deterministic neutron and gamma radiation transport calculations for ORNL and external customers.
- Lead analyst for projects applying hybrid radiation transport methods (ADVANTG/MCNP and the SCALE MAVRIC sequence) to pressure vessel fluence calculations for the ORNL High Flux Isotope Reactor (HFIR) and for a large-scale Criticality Accident Alarm System (CAAS) evaluation.
- Applications of hybrid radiation transport to beamline shielding analyses for the ORNL Spallation Neutron Source and to fusion neutronics analyses for the International Thermonuclear Experimental Reactor (ITER).
- Principal Investigator for a two-year Laboratory Directed Research and Development project to develop and demonstrate an integrated toolset for analysis of material irradiation experiments and isotope production in HFIR.
- Radiation shielding analyses and reviews for Safety Analysis Report (SAR) and Safety Analysis Report for Packaging (SARP) submittals.
- Instructor for the SCALE MAVRIC course and for related courses covering applications of radiation transport methods.

December 2008 – January 2010
Principal Engineer, Radiation Analysis, Westinghouse Electric Company, Madison, PA

- Performed neutron and gamma shielding and radiation analysis evaluations for commercial reactors using deterministic (DORT) and Monte Carlo (MCNP) techniques.

July 1999 – November 2008
Senior Engineer / Principal Engineer (9/2002), Radiation Shielding, Bechtel Bettis Atomic Power Laboratory, West Mifflin, PA

- Performed neutron and gamma shield design evaluations for naval reactor plant designs using deterministic (PARTISN) and Monte Carlo (MCNP) techniques.
- Lead author/editor for the neutron shield design report for a new reactor plant design.
- Developed post-processing software to analyze and visualize the results of two-dimensional and three-dimensional PARTISN calculations.
- Developed data analysis and visualization software to facilitate the evaluation of new multigroup cross-section data sets.
- Evaluated optimal parameter sets for angular quadrature and energy group structure for large-scale deterministic transport calculations.
- Lead editor for an inter-laboratory shield design manual which serves as the standard for naval reactors shield design work.
- Served as mentor for new employees, summer interns, and graduate fellows.
- Taught a radiation shielding course to Navy officers and Bettis employees in the Bettis Reactor Engineering School for six years.
- Received a corporate engineering achievement award for an innovative MCNP analysis of radiation streaming through structural fitup gaps.

September 1998 – June 1999
Senior Information Systems Analyst, Bayer Corporation, Pittsburgh, PA

- Performed lead role in regulatory compliance issues for network infrastructure organization.
- Developed budget planning and forecasting tools and tracked major project costs.

August 1988 – August 1998
Senior Engineer, Radiation Shielding, Westinghouse Bettis Atomic Power Laboratory, West Mifflin, PA

- Performed radiation shielding design calculations using deterministic, Monte Carlo, and point kernel techniques to support new reactor plant designs and spent fuel shipments.
- Led a qualification project for the use of MCNP for nuclear instrument response calculations.
- Led the development and qualification of a new multigroup cross-section library and improved energy group structure for deterministic radiation transport design applications including vessel damage predictions.
- Developed and presented a course on model generation and analysis with TPT, an in-house deterministic radiation transport code.
- Performed shielding analyses and wrote SARP chapters for shipment of spent nuclear fuel.
- Coordinated inter-laboratory long-range technology development plans.
- Presented new methods developments in semi-annual and annual government review meetings.
- Performed shield survey testing following refueling overhauls.
- Created a local computing environment using Unix workstations to provide engineering design and analysis capabilities at a significantly lower cost than the use of mainframe computing.

- Served as mentor for new employees and summer interns.

August 1986 – July 1988
Engineer, Nuclear Analysis, Westinghouse Bettis Atomic Power Laboratory, West Mifflin, PA
- Performed core physics analyses using diffusion theory and Monte Carlo techniques.
- Performed criticality analyses for shipment of spent nuclear fuel.
- Served as test engineer for physics testing at a prototype reactor plant.
- Served as mentor for two new employees.

RELEVANT APPLICATION SOFTWARE AND PROGRAMMING SKILLS

- Deterministic radiation transport: Denovo, PARTISN, TPT, DORT
- Monte Carlo radiation transport: MCNP, Monaco, MCNPX
- Cross-section processing: NJOY, TRANSX
- PV-WAVE (a fourth-generation programming language with extensive graphics features)
- Fortran, Python, Unix shell scripting

SELECTED PUBLICATIONS

J. J. Jarrell, M. L. Adams, and J. M. Risner, "Application of Quadruple Range Quadratures to Three-Dimensional Model Shielding Problems," *Nucl. Technol.* **168** (2), 424-430, 2009.

S. J. Nathan, J. M. Risner, and S. Sitaraman, "Packaging Certification Program Methodology for Determining Dose Rates for Small Gram Quantities in Shipping Packagings," PCP-2011-0001, prepared for the U.S. Department of Energy (2011).

J. M. Risner, D. Wiarda, M. E. Dunn, T. M. Miller, D. E. Peplow, and B. W. Patton, "Development and Testing of the VITAMIN-B7/BUGLE-B7 Coupled Neutron-Gamma Multigroup Cross-Section Libraries," *Fourteenth International Symposium on Reactor Dosimetry*, Bretton Woods, N.H., May 22-27, 2011.

J. M. Risner, D. Wiarda, M. E. Dunn, T. M. Miller, D. E. Peplow, and B. W. Patton, "Production and Testing of the VITAMIN-B7 Fine-Group and BUGLE-B7 Broad-Group Coupled Neutron/Gamma Cross-Section Libraries Derived from ENDF/B-VII.0 Nuclear Data," NUREG/CR-7045 (ORNL/TM-2011/12), prepared for the U.S. Nuclear Regulatory Commission by Oak Ridge National Laboratory, Oak Ridge, Tenn., September 2011.

J. M. Risner and E. D. Blakeman, "Analysis of dpa rates in the HFIR reactor vessel using a hybrid Monte Carlo/deterministic method", *Fifteenth International Symposium on Reactor Dosimetry*, Aix en Provence, France, May 18-23, 2014.