

B. L. Broadhead

PUBLICATIONS

1979

B. L. Broadhead and J. H. Marable, "Sensitivity and Uncertainty Analysis Applied to the NBS-ISNF," pp. 161-178 in *A Review of the Theory and Application of Sensitivity and Uncertainty Analysis, Proceedings of a Seminar-Workshop, Oak Ridge, Tennessee, August 22-24, 1978*, ORNL/RSIC-42, February 1979.

1980

B. L. Broadhead and J. J. Wagschal, "The ISNF: A New CSEWG Dosimetry Benchmark (Computational Problems and Their Solution)," *Trans. Am. Nucl. Soc.* **35**, 466-8 (1980).

J. M. Ryskamp, R. A. Anderl, B. L. Broadhead, W. E. Ford III, J. L. Lucius, J. H. Marable, and J. J. Wagschal, "Sensitivity and *A Priori* Uncertainty Analysis of the CFRMF Central Flux Spectrum," *Trans. Am. Nucl. Soc.* **35**, 556-557 (1980).

1981

J. D. Smith III and B. L. Broadhead, *Multigroup Covariance Matrices for Fast Reactor Studies*, ORNL/TM-7389, Martin Marietta Energy Systems, Oak Ridge National Laboratory, April 1981.

J. J. Wagschal and B. L. Broadhead, "Evaluation of the New ISNF One-Dimensional Model," *Trans. Am. Nucl. Soc.* **39**, 887-9 (1981).

B. L. Broadhead and H. L. Dodds, Jr., "Treatment of Energy Self-Shielding (f-factors) in Data Adjustments for Fast Reactors," *Trans. Am. Nucl. Soc.* **39**, 929-930 (1981).

R. E. Maerker, J. J. Wagschal, and B. L. Broadhead, *Development and Demonstration of an Advanced Methodology for LWR Dosimetry Applications*, EPRI NP-2188, Research Project 1399-1; Interim Report, December 1981.

1982

J. J. Wagschal, R. E. Maerker, and B. L. Broadhead, "Surveillance Dosimetry: Achievements and Disappointments," *4th Am. Soc. Test. Mater./EURATOM Symp. Reactor Dosimetry* **1**, 79-92, Gaithersburg, MD, March 21-26, 1982.

J. M. Ryskamp, R. A. Anderl, B. L. Broadhead, W. E. Ford III, J. L. Lucius, J. H. Marable, and J. J. Wagschal, "Sensitivity and Uncertainty Analysis of the Coupled Fast Reactivity Measurements Facility Central Flux Spectrum," *Nucl. Technol.* **57**, 20–35 (April 1982).

1983

B. L. Broadhead and H. L. Dodds, "Sensitivity Coefficients of Self-Shielded Cross Sections to the Resonance Parameters," *Trans. Am. Nucl. Soc.* **45**, 703–4 (1983).

J. J. Wagschal, R. E. Maerker, and B. L. Broadhead, "Uncertainty Analysis of Benchmark Dosimetry Measurements," *Nucl. Data for Sci. and Technol.*, 436–440 (1983).

1984

B. L. Broadhead, *A Nuclear Data Adjustment Methodology Utilizing Resonance Parameter Sensitivities and Uncertainties*, ORNL/CSD/TM-212, 1984.

B. L. Broadhead, D. G. Cacuci, and J. V. Pace, "Adjoint Transport Calculations for Sensitivity Analysis of the Hiroshima Air-Over-Ground Environment," *Trans. Am. Nucl. Soc.* **46**, 638–40 (1984).

B. L. Broadhead and R. E. Maerker, "Sensitivities of the Flux Spectrum in the Cavity of a PWR to Variations in the Core Source Distribution," *Trans. Am. Nucl. Soc.* **46**, 659–61 (1984).

B. L. Broadhead, N. B. Gove, and S. Raman, *Preanalysis Calculations of the US/UK Joint Experiment in the Dounreay Prototype Fast Reactor*, ORNL-6058, 1984.

H. L. Adair, S. Raman, B. L. Broadhead, and R. L. Walker, "Availability and Use of Radiometric Neutron Monitor Materials for Characterizing Nuclear Reactor Environments," *Proc. Int. Nucl. Target Dev. Soc. 12th World Conf.*, Antwerp, Belgium, September 24–28, 1984.

1985

R. E. Maerker, B. L. Broadhead, and M. L. Williams, "Recent Progress and Developments in LWR-PV Computational Methodology," *Proc. 5th Am. Soc. Test. Mater.-EURATOM Symp. Reactor Dosimetry* **1**, 639–48, Federal Republic of Germany, September 24–28, 1984.

H. L. Adair, S. Raman, B. L. Broadhead, and R. L. Walker, "Availability and Use of Radiometric Neutron Monitor Materials for Characterizing Nuclear Reactor Environments," *Nucl. Instrum. Methods Phys. Res.* **A236**, 591–9 (1985).

R. E. Maerker, B. L. Broadhead, C. Y. Fu, J. J. Wagschal, J. G. Williams, and M. L. Williams, "Combining Integral and Differential Dosimetry Data in an Unfolding Procedure with Application to the Arkansas Nuclear One-Unit 1 Reactor," *Int. Conf. Nuclear Data for Basic and Applied Science*, Santa Fe, NM, May 13–17, 1985.

R. E. Maerker, B. L. Broadhead, and M. L. Williams, "Application of LEPRICON Methodology to the Unfolding of Neutron Fluxes in the Arkansas Nuclear One-Unit 1 Reactor," *Trans. Am. Nucl. Soc.* **49**, 425–6 (1985).

R. E. Maerker, M. L. Williams, B. L. Broadhead, J. J. Wagschal, and C. Y. Fu, *Revision and Expansion of the Data Base in the LEPRICON Dosimetry Methodology*, EPRI NP-3841, Electric Power Research Institute, January 1985.

R. E. Maerker, B. L. Broadhead, and J. J. Wagschal, "Theory of a New Unfolding Procedure in Pressurized Water Reactor Pressure Vessel Dosimetry and Development of an Associated Benchmark Data Base," *Nucl. Sci. Eng.* **91**, 369–392 (1985).

1986

R. E. Maerker, M. L. Williams, and B. L. Broadhead, "Accounting for Changing Source Distributions in Light Water Reactor Surveillance Dosimetry Analysis," *Nucl. Sci. Eng.* **94**, 291–308 (1986).

R. E. Maerker, B. L. Broadhead, B. A. Worley, M. L. Williams, and J. J. Wagschal, *Application of the LEPRICON Methodology to the Arkansas Nuclear One, Unit 1 Reactor*, EPRI NP-4469, Electric Power Research Institute, February 1986.

R. E. Maerker, B. L. Broadhead, B. A. Worley, M. L. Williams, and J. J. Wagschal, "Application of the LEPRICON Unfolding Procedure to the Arkansas Nuclear One - Unit 1 Reactor," *Nucl. Sci. Eng.* **93**, 137–170 (1986).

1987

C. V. Parks, B. L. Broadhead, R. W. Roussin, J. C. Gauthey, S. N. Cramer, and B. L. Kirk, "Intercomparison of Cross-Section Libraries Used for Spent Fuel Cask Shielding Analyses," *Proceedings of Theory and Practices in Radiation Protection and Shielding*, April 22–24, 1987, Knoxville, TN, Vol. 2, pp. 559–569, 1987.

R. A. Lillie, B. L. Broadhead, J. V. Pace III, and D. G. Cacuci, "Sensitivity/Uncertainty Analysis for the Nagasaki Dosimetry Reevaluation Effort," *Proceedings of Theory and Practices in Radiation Protection and Shielding*, April 22–24, 1987, Knoxville, TN, Vol. 2, pp. 139–148, 1987.

B. L. Broadhead, R. A. Lillie, J. V. Pace III, and D. G. Cacuci, "Sensitivity/Uncertainty Analysis for the Hiroshima Dosimetry Reevaluation Effort," *Proceedings of Theory and Practices in Radiation Protection and Shielding*, April 22–24, 1987, Knoxville, TN, Vol. 2, pp. 149–157, 1987.

1988

B. L. Broadhead, Report of Foreign Travel to Belgium, ORNL/CSD/FTR-2896, June 1988.

C. V. Parks, B. L. Broadhead, S. N. Cramer, J. C. Gauthey, O. W. Hermann, B. L. Kirk, R. W. Roussin, and J. S. Tang, *Assessment of Shielding Analysis Methods, Codes, and Data for Spent Fuel Transport/Storage Applications*, ORNL/CSD/TM-246, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., September 1988.

R. A. Lillie, B. L. Broadhead, J. V. Pace III, and D. G. Cacuci, "Sensitivity/Uncertainty Analysis for Free-in-Air Tissue Kerma Due to Initial Radiation at Hiroshima and Nagasaki," *Nucl. Sci. Eng.* **100**, 105–124 (1988).

1989

C. V. Parks, R. M. Westfall, and B. L. Broadhead, "Criticality Analysis Support for the Three-Mile Island Unit 2 Fuel Removal Operations," *Nucl. Tech.* **87**, 660–678, November 1989.

1990

C. V. Parks and B. L. Broadhead, Report of Foreign Travel to Paris, France, ORNL/CSD/FTR-3549, March 1990.

B. L. Broadhead, *QADS: A Multidimensional Point Kernel Analysis Module*, NUREG/CR-5468 (ORNL/CSD/TM-270), U.S. Nuclear Regulatory Commission, May 1990.

B. L. Broadhead, M. C. Brady, and C. V. Parks, *Benchmark Shielding Calculations for the NEACRP Working Group on Shielding Assessment of Transportation Packages*, ORNL/CSD/TM-272, November 1990.

B. L. Broadhead, "Burnup Credit Feasibility for BWR Spent Fuel Shipments," *Trans. Am. Nucl. Soc.* **62**, 319–321 (November 1990).

B. L. Broadhead, M. C. Brady, and C. V. Parks, "Benchmarking of Dose Rate Calculations for Spent Fuel Transportation Casks," *Trans. Am. Nucl. Soc.* **62**, 435–436 (November 1990).

J. T. Mihalczo and B. L. Broadhead, "Burnup Credit Allowance in the Storage and Transport of LWR Fuel-Pool, Measurements, and Applications," *Trans. Am. Nucl. Soc.* **62**, 322–324 (November 1990).

1991

B. L. Broadhead, S. Raman, and J. K. Dickens, "Measurement and Calculation of High Actinide Burnup in the Prototype Fast Reactor (PFR)," *Trans. Am. Nucl. Soc.*, ANS Annual Meeting, Orlando, FL, June 2–6, 1991.

B. L. Broadhead, *Feasibility Assessment of Burnup Credit in the Criticality Analysis of Shipping Casks with Boiling Water Reactor Spent Fuel*, ORNL/CSD/TM-268, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., August 1991.

B. L. Broadhead, "Criticality Safety Review of 2 1/2-, 10-, and 14-Ton UF₆ Cylinders," *Int. Conf. on Nuclear Criticality Safety*, Christ Church, Oxford, Great Britain, September 9–13, 1991; also see ORNL/TM-11947.

B. L. Broadhead, J. S. Tang, and C. V. Parks, "SAS1 and SAS4, Two New Shielding Analysis Sequences for Spent Fuel Casks," *Proc. Seminar on SCALE-4 and Related Modular Systems for the Evaluation of Nuclear Facilities and Package Design Featuring Criticality, Shielding and Transfer Capabilities*, Saclay, France, September 17–19, 1991, pp. 210–221.

B. L. Broadhead, S. Raman, and J. K. Dickens, "Measurement and Calculation of High-Actinide Burnup in the Prototype Fast Reactor (PFR)," *Trans. Am. Nucl. Soc.* **63**, 88–89 (1991).

B. L. Broadhead, *Criticality Safety Review of 2 1/2-, 10-, and 14-Ton UF₆ Cylinders*, ORNL/TM-11947, 1991; also presented at *International Conference on Nuclear Criticality Safety*, Christ Church, Oxford, England, September 9–13, 1991.

B. L. Broadhead, *Feasibility Assessment of Burnup Credit in the Criticality Analysis of Shipping Casks with Boiling Water Reactor Spent Fuel*, ORNL/CSD/TM-268, August 1991.

B. L. Broadhead and C. V. Parks, "SCALE-4 Shipping Cask Shielding Applications," *Proc. Seminar on SCALE-4 and Related Modular Systems for the Evaluation of Nuclear Facilities and Package Design Featuring Criticality, Shielding and Transfer Capabilities*, Saclay, France, September 17–19, 1991, pp. 33–46

B. L. Broadhead, "An Overview of the QADS Code," *Proc. Seminar on SCALE-4 and Related Modular Systems for the Evaluation of Nuclear Facilities and Package Design Featuring Criticality, Shielding and Transfer Capabilities*, Saclay, France, September 17–19, 1991, pp. 163–174.

B. L. Broadhead, J. S. Tang, and C. V. Parks, "SAS1 and SAS4, Two New Shielding Analysis Sequences for Spent Fuel Casks," *Proc. Seminar on SCALE-4 and Related Modular Systems for the Evaluation of Nuclear Facilities and Package Design Featuring Criticality, Shielding and Transfer Capabilities*, Saclay, France, September 17–19, 1991, pp. 210–221.

B. L. Broadhead, *Report of Foreign Travel to Scotland, England, France*, ORNL/CSD/FTR-4066, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., October 7, 1991.

C. V. Parks, O. W. Hermann, and B. L. Broadhead, "The SCALE Analysis Sequence for LWR Fuel Depletion," *Proc. of ANS/ENS International Topical Meeting*, Pittsburgh, PA, April 28–May 1, 1991, pp. 10.2.3.1–10.2.3.14.

1992

S. Raman, B. L. Broadhead, J. K. Dickens, R. L. Walker, and J. L. Botts, *Analyses of Physics Specimens in Fuel Pins 1 and 2 Irradiated in the Dounreay Prototype Fast Reactor*, ORNL/6632, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., January 1992.

B. L. Broadhead and C. V. Parks, "Assessment of Dose Factor Changes to Spent Fuel Cask Analyses," *Trans. Am. Nucl. Soc.* **66**, 421–423 (1992).

B. L. Broadhead, C. V. Parks, and R. B. Pope, "Assessment of Proposed Dose Factor Changes to Shipping Cask Design and Operation," pp. 2174–2181, Vol. 2, *Proc. Third International Conference on High Level Radioactive Waste Management*, Las Vegas, NV, April 12–16, 1992.

B. L. Broadhead, C. V. Parks, D. S. Joy, and J. S. Tang, "Preliminary Assessment of the Benefits of Derating a Cask for Increasing Age/Burnup Capability," pp. 2182–2189, Vol. 2, *Proc. Third International Conference on High Level Radioactive Waste Management*, Las Vegas, NV, April 12–16, 1992.

C. V. Parks, B. L. Broadhead, and M. C. Brady, "Status of Shielding Analysis Methods for Transport Packages," *Proc. of IRPA8*, Montreal, Canada, May 17–22, 1992, Vol. II, pp. 1650–1653.

B. L. Broadhead, "Processing of Resonance Parameter Covariance Files," pp. 238–252 *Proc. NEANSC Specialists' Meeting on Evaluation and Processing of Covariance Data*, Oak Ridge, TN, October 7–9, 1992.

R. E. Maerker, B. L. Broadhead, and J. J. Wagschal, "Needs for Evaluated Covariance Data for Reactor Pressure Vessel Dosimetry," pp. 13–32, *Proc. NEANSC Specialists' Meeting on Evaluation and Processing of Covariance Data*, Oak Ridge, TN, October 7–9, 1992.

B. L. Broadhead, R. L. Childs, R. M. Westfall, and C. V. Parks, *Evaluation of Criticality Alarm Response at the WEMCO Fernald Site*, ORNL/TM-12232, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., November 1992.

1993

B. L. Broadhead, J. S. Tang, C. V. Parks, and H. Taniuchi, "Shielding Benchmark Calculations of Selected Spent Fuel Storage Cask Experiments," pp. 1377–1382, Vol. 2, *Proc. Fourth Annual International Conference on High Level Radioactive Waste Management*, Las Vegas, NV, April 26–30, 1993.

J. S. Tang and B. L. Broadhead, "Development and Application of the Automated Monte Carlo Biasing Procedure in SAS4," *Proc. Advanced Monte Carlo Computer Programs for Radiation Transport*, OECD-NEA, Saclay, France, April 27–29, 1993.

1994

B. L. Broadhead, H. F. Locke, and A. F. Avery, "NEACRP Comparison of Source Term Codes for the Radiation Protection Assessment of Transportation Packages," pp. 738–745, *Proc. 8th International Conference on Radiation Shielding*, Arlington, TX, April 24–28, 1994

H. Taniuchi and B. L. Broadhead, "Simple Geometry Dose Rate Benchmarks for Spent Fuel Cask Analysis," pp. 746–753, *Proc. 8th International Conference on Radiation Shielding*, Arlington, TX, April 24–28, 1994

B. L. Broadhead, R. L. Childs, and R. M. Westfall, "Evaluation of Fernald Plant 6 Criticality Alarm Response," *Trans. Am. Nucl. Soc.* **70**, 206–208 (June 1994).

B. L. Broadhead, Report of Foreign Travel to Vienna, ORNL/FTR-5266, December 1994.

1995

B. L. Broadhead, "Feasibility Assessment of Burnup Credit in the Criticality Analysis of Shipping Casks with Boiling Water Reactor Spent Fuel," *Nucl. Tech.* **110**, 1–21 (April 1995).

B. L. Broadhead, J. S. Tang, R. L. Childs, C. V. Parks, and H. Taniuchi, *Evaluation of Shielding Analysis Methods in Spent Fuel Cask Environments*, EPRI TR-104329, Electric Power Research Institute, May 1995.

B. L. Broadhead and C. M. Hopper, "Updated Tool for Nuclear Criticality Accident Emergency Response," *Trans. Am. Nucl. Soc.* **72**, 218–220 (June 1995).

B. L. Broadhead, M. D. DeHart, J. C. Ryman, J. S. Tang, and C. V. Parks, *Investigation of Nuclide Importance to Functional Requirements Related to Transport and Long-Term Storage of LWR Spent Fuel*, ORNL/TM-12742, Lockheed Martin Energy Systems, Inc., Oak Ridge Natl. Lab., June 1995.

B. L. Broadhead, *Report of Foreign Travel to England*, ORNL/FTR-5424, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., July 5, 1995.

B. L. Broadhead, R. L. Childs, and C. M. Hopper, "Verification of Criticality Accident Alarm System for Environmental Restoration Activities," presented at ICNC'95 Fifth International Conference on Nuclear Criticality Safety, Albuquerque, NM, September 17–21, 1995.

B. L. Broadhead and C. V. Parks, "Overview of SCALE System Shielding Capabilities," *Trans. Am. Nucl. Soc.* **73**, 360–61 (1995).

J. S. Tang and B. L. Broadhead, "Applications of SAS4 Monte Carlo Shielding Sequence to Deep-Penetration Problems," *Trans. Am. Nucl. Soc.* **73**, 363–64 (1995).

C. V. Parks and B. L. Broadhead, "Review of Criticality Safety and Shielding Analysis Issues for Transportation Packages," PATRAM'95, Las Vegas, NV, December 3-8, 1995.

S. M. Bowman and B. L. Broadhead, "Dose Rates in the ABWR Upper Drywell for a Dropped Fuel Bundle Accident," *Trans. Am. Nucl. Soc.* **73**, 364–66 (1995).

1996

B. L. Broadhead, R. L. Childs, J. S. Tang, and C. M. Hopper, *Verification of Criticality Accident Alarm System for Molten Salt Reactor Remediation Activities*, ORNL/CF-95/99, January 1996.

B. L. Broadhead, "Shielding Analyses: The Rabbit vs the Turtle?" *Proc. of Radiation Protection & Shielding 1996 Topical Meeting, Advances and Applications in Radiation Protection and Shielding*, Vol. 1, 322 (1996).

C. V. Parks, L. M. Petrie, S. M. Bowman, B. L. Broadhead, N. M. Greene, and J. E. White, "SCAMPI: A Code Package for Cross-Section Processing," *Proc. of Radiation Protection & Shielding 1996 Topical Meeting, Advances and Applications in Radiation Protection and Shielding*, Vol. 2, 1080 (1996).

B. L. Broadhead and R. L. Childs, "ORNL Contribution to the IAEA Benchmark Problem on Fission Reactor Decommissioning," *Proc. of Radiation Protection & Shielding 1996 Topical Meeting, Advances and Applications in Radiation Protection and Shielding*, Vol. 2, 541 (1996).

B. L. Broadhead, R. L. Childs, and C. V. Parks, *Shielding and Criticality Analyses of Phase I Reference Truck and Rail Cask Designs for Spent Nuclear Fuel*, ORNL/TM-12395, March 1996.

S. M. Bowman, B. L. Broadhead, and L. M. Petrie, *Report of Foreign Travel by S. M. Bowman, B. L. Broadhead, and L. M. Petrie*, ORNL/FTR-5858, July 1996.

B. L. Broadhead, M. B. Emmett, and J. S. Tang, *Guide to Verification and Validation of the SCALE-4 Radiation Shielding Software*, NUREG/CR-6484 (ORNL/TM-13277), December 1996.

1997

B. L. Broadhead, "Application of Generalized Linear Least-Squares Methodology to Criticality Safety Computations," ANS 1997 Winter Meeting and Embedded Topical Mtgs., Albuquerque, NM, November 16-20, 1997.

B. L. Broadhead, C. M. Hopper, R. L. Childs, and J. S. Tang, *An Updated Nuclear Criticality Slide Rule. Volume 1: Technical Basis*, NUREG/CR-6504, Vol. 1 (ORNL/TM-13322/V1) April 1997.

L. E. Toran, C. M. Hopper, M. T. Naney, C. V. Parks, J. F. McCarthy, B. L. Broadhead, and V.A. Colten-Bradley, *The Potential for Criticality Following Disposal of Uranium at Low-Level Waste Facilities. Volume 1: Uranium Blended with Soil*, NUREG/CR-6505, Vol. 1 (ORNL/TM-13323/V1) June 1997.

B. L. Broadhead, J. S. Tang, R. L. Childs, C. V. Parks, and H. Taniuchi, "Evaluation of Shielding Analysis Methods in Spent-Fuel Cask Environments," *Nucl. Tech.* **117**, 206–22 (February 1997).

S. M. Bowman, B. L. Broadhead, D. F. Hollenbach, and L. M. Petrie, Jr., *Joint Report of Foreign Travel to Rez (near Prague), Czech Republic*, ORNL/FTR-6399, October 9–18, 1997.

B. L. Broadhead, "Application of Generalized Linear Least-Squares Methodology to Criticality Safety Computations," *Trans. Am. Nucl. Soc.*, **77**, 234–235 (1997).

B. L. Broadhead, R. T. Primm III, and S. E. Fisher, "Strategy for Validating Shielding Methods for Reactor-Based Disposition of Weapons-Grade Plutonium," *Trans. Am. Nucl. Soc.*, **77**, 318–319 (1997).

1998

Margaret B. Emmett, Stephen M. Bowman, and Bryan L. Broadhead, "SCALE Radiation Shielding Verification and Validation Package," pp. 91–97 in *Proceedings of the 1998 ANS Radiation Protection and Shielding Division Topical Conference on Technologies for the New Century*, Vol. 1, Nashville, Tenn., April 19–23, 1998.

B. L. Broadhead, R. L. Childs, C. M. Hopper, and C. V. Parks, "Dose Consequences from a Postulated Criticality Occurring in a Low-Level-Waste Disposal Facility," pp. 390–395 in *Proceedings of the 1998 ANS Radiation Protection and Shielding Division Topical Conference on Technologies for the New Century*, Vol. 1, Nashville, Tenn., April 19–23, 1998.

C. M. Hopper and B. L. Broadhead, "An Updated Nuclear Criticality Slide Rule: Functional Slide Rule," NUREG/CR-6504, Vol. 2 (ORNL/TM-13322/V2), April 1998.

B. L. Broadhead, H. Taniuchi, and C. V. Parks, "Chapter 9. Shielding," *The Radioactive Materials Packaging Handbook: Design, Operations, and Maintenance*, L. B. Shappert, Ed., June 1998, ORNL/M-5003, Oak Ridge National Laboratory, 1998, pp. 9-1 – 9-52.

C. V. Parks, S. M. Bowman, and B. L. Broadhead, "Appendix E: The Standardized Computer Analysis for Licensing Evaluation (SCALE) Program," *The Radioactive Materials Packaging Handbook: Design, Operations, and Maintenance*, L. B. Shappert, Ed., June 1998, ORNL/M-5003, Oak Ridge National Laboratory, 1998, pp. E-1 – E-12.

C. V. Parks, M. D. DeHart, B. L. Broadhead, C. M. Hopper, and L. M. Petrie, "Development of Nuclear Analysis Capabilities for DOE Waste Management Activities," *Environmental Management Science Program Workshop*, Chicago, Illinois, July 27–30, 1998, CONF-980736, July 1998 (Poster 113).

B. L. Broadhead and B. T. Rearden, "Exploratory Studies for Three-Dimensional Sensitivity Methods," ORNL/M-6583, August 1998.

B. L. Broadhead, "K-Infinite Trends with Burnup, Enrichment, and Cooling Time for BWR Fuel Assemblies," ORNL/M-6155, August 1998.

R. Dowe Dabbs, Bryan L. Broadhead, and B. Tatum Fowler, "Reporting Actinide Inventories in Irradiated Fuel at the High Flux Isotope Reactor," Volume 2, pp. 581–588 in *Proc. of Third Topical Meeting on DOE Spent Nuclear Fuel and Fissile Materials Management*, September 8–11, 1998, Charleston, SC.

1999

C. V. Parks, B. T. Rearden, M. D. DeHart, B. L. Broadhead, C. M. Hopper, and L. M. Petrie, "Annual Environmental Management Science Program (EMSP) Summary Progress Report. Project Title Development of Nuclear Analysis Capabilities for DOE Waste Management Activities," ORNL/TM-1999/101, June 1999.

C. M. Hopper, B. L. Broadhead, R. L. Childs, and C. V. Parks, "Slide Rule for Rapid Response Estimation of Radiological Dose from Criticality Accidents," pp. 1334–1344 in *Proceedings of ICNC'99, Sixth International Conference on Nuclear Criticality Safety*, Vol. III, Palais des Congrès, Versailles, FRANCE, September 20–24, 1999. Oral Presentation. [Paper]

M. D. DeHart and B. L. Broadhead, "Investigation of Burnup Credit Issues in BWR Fuel," pp. 586–595, in *ICNC'99 Sixth International Conference on Nuclear Criticality Safety*, Vol. II, Palais des Congrès, Versailles, FRANCE, September 20–24, 1999. [Paper]

B. L. Broadhead, R. L. Childs, and B. T. Rearden, "Computational Methods for Sensitivity and Uncertainty Analysis in Criticality Safety," pp. 57–65 in *Proceedings of ICNC'99, Sixth International Conference on Nuclear Criticality Safety*, Vol. I, Palais des Congrès, Versailles, FRANCE, September 20–24, 1999. [Paper]

B. L. Broadhead, M. B. Emmett, and J. S. Tang, "Implementation of Surface Detector Option in SCALE SAS4 Shielding Module," October 17–22, 1999, Tsukuba, Ibaraki, Japan. [Abstract]

B. L. Broadhead, C. M. Hopper, and C. V. Parks, "Proposed Methodology for Establishing Area of Applicability," pp. 787–798 in *Proceedings of ICNC'99, Sixth International Conference on Nuclear Criticality Safety*, Vol. II, Palais des Congrès, Versailles, FRANCE, September 20–24, 1999. [Paper]

D. F. Hollenbach and B. L. Broadhead, Joint Report of Foreign Travel to Paris, France, September 17–25, 1999, XA 108390, XA 108019 (October 1999).

B. L. Broadhead, C. M. Hopper, and C. V. Parks, "Sensitivity and Uncertainty Analysis Applied to Range of Applicability Determination," in *Proc. of American Nuclear Society 1999 Winter Meeting*, Long Beach, California, November 14–18, 1999. *Trans. Am. Nucl. Soc.*, **81**, 172–174 (1999).

O. W. Hermann and B. L. Broadhead, "Input Description of the SAS2HC Code for MOX Fuel Depletion in the ATR Experiment," ORNL/TM- , Month Year.

B. L. Broadhead, C. M. Hopper, R. L. Childs, and C. V. Parks, "Sensitivity and Uncertainty Analyses Applied to Criticality Safety Validation, Volume 1: Methods Development," NUREG/CR-6655, Vol. 1 (ORNL/TM-13692/V1), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, November 1999.

B. L. Broadhead, C. M. Hopper, and C. V. Parks, "Sensitivity and Uncertainty Analyses Applied to Criticality Safety Validation, Volume 2: Illustrative Applications and Initial Guidance," NUREG/CR-6655, Vol. 2 (ORNL/TM-13692/V2), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, November 1999.

B. L. Broadhead, M. B. Emmett, and J. S. Tang, "Implementation of Surface Detector Option in SCALE SAS4 Shielding Module," ICRS-9 – Ninth International Conference on Radiation Shielding, October 17–22, 1999, Tsukuba, Ibaraki, Japan. *J. Nucl. Sci. Technol. Supplement* **1**, 427–431 (March 2000).

B. L. Broadhead and S. M. Bowman, Joint Report of Foreign Travel to Tsukuba, Japan (10/17–21/1999) and Tokai, Japan (10/25–29/1999), XA 110619, XA 109916 (November 1999).

2000

SCALE: A Modular Code System for Performing Standardized Computer Analyses for Licensing Evaluation, NUREG/CR-0200, Rev. 6 (ORNL/NUREG/CSD-2R6), Vol. I, II, and III, May 2000. Available from Radiation Safety Information Computational Center at Oak Ridge National Laboratory as CCC-545.

C. V. Parks, B. T. Rearden, M. D. DeHart, B. L. Broadhead, C. M. Hopper, and L. M. Petrie, "Annual Environmental Management Science Program (EMSP) Project Summary. Project Title: Development of Nuclear Analysis Capabilities for DOE Waste Management Activities," ORNL/TM-2000/65, February 2000.

C. M. Hopper and B. L. Broadhead, "The Applicable Ranges of Bounding Curves & Data Task of the DOE Nuclear Criticality Safety Program, Status Review & Future Work Areas," *DOE Nuclear Criticality Technology & Safety Workshop*, March 29, 2000, Albuquerque, NM.

B. L. Broadhead, C. M. Hopper, and C. V. Parks, "Application of Covariance DATA to Criticality Safety Data Validation," *Proc. of Nuclear Data Covariance Workshop, Brookhaven National Laboratory*, April 22-23, 1999, pp. 95-107, ORNL/TM-2000/19, April 2000.

M.E. Dunn and B. L. Broadhead, "PUFF-III: A Multigroup Covariance Processing Code for the AMPX Cross Section Processing System," Session XI.D, p. XI.D.-2, *Abstracts of the PHYSOR 2000, ANS International Topical Meeting on Advances in Reactor Physics and Mathematics and Computation into the Next Millennium*, May 7-12, 2000, Westin William Penn Hotel, Pittsburgh, Pennsylvania, USA. ISBN: 0-89448-655-1; ANS Order No. 2700281 (May 2000).

B. L. Broadhead, C. M. Hopper, S. C. Frankle, J. F. Briesmeister, R. C. Little, and J. J. Wagschal, *Further Investigations of NIST Water Sphere Discrepancies*, ORNL/TM-2000/173, UT-Battelle, LLC, Oak Ridge National Laboratory, October 2000.

B. L. Broadhead, "Uncertainty Analysis Methods for S/U Criticality Validation Techniques," *Proc. of ANS/ENS 2000 International Winter Meeting and Embedded Topical Meetings*, November 12-16, 2000, Washington, D.C. *Trans. Am. Nucl. Soc.* **83**, 95-98, 2000.

B. L. Broadhead, "Value Rankings of Selected Critical Experiments for Burnup Credit Validations," *Proc. of ANS/ENS 2000 International Winter Meeting and Embedded Topical Meetings*, November 12-16, 2000, Washington, D.C. *Trans. Am. Nucl. Soc.* **83**, 124-126, 2000.

B. L. Broadhead, R. L. Childs, and C. M. Hopper, "Illustrative Examples of Least-Squares Methods for Criticality Safety," *Proc. of ANS/ENS 2000 International Winter Meeting and Embedded Topical Meetings*, November 12-16, 2000, Washington, D.C. *Trans. Am. Nucl. Soc.* **83**, 100-103, 2000.

B. L. Broadhead, C. M. Hopper, K. R. Elam, B. T. Rearden, and R. L. Childs, "Criticality Safety Applications of S/U Validation Methods," *Proc. of ANS/ENS 2000 International Winter Meeting and Embedded Topical Meetings*, November 12-16, 2000, Washington, D.C. *Trans. Am. Nucl. Soc.* **83**, 107-113, 2000.

B. L. Broadhead and B. T. Rearden, "Foundations for Sensitivity Based Criticality Validation Techniques," *Proc. of ANS/ENS 2000 International Winter Meeting and Embedded Topical Meetings*, November 12-16, 2000, Washington, D.C. *Trans. Am. Nucl. Soc.* **83**, 93-95, 2000.

B. T. Rearden, C. M. Hopper, K. R. Elam, B. L. Broadhead, and P. B. Fox, "Prototypic Applications of Sensitivity and Uncertainty Analysis for Experiment Needs," *Proc. of ANS/ENS 2000 International Winter Meeting and Embedded Topical Meetings*, November 12-16, 2000, Washington, D.C. *Trans. Am. Nucl. Soc.* **83**, 103-107, 2000.

C. V. Parks, I. C. Gauld, J. C. Wagner, B. L. Broadhead, M. D. DeHart, and D. D. Ebert, "Research Supporting Implementation of Burnup Credit in the Criticality Safety Assessment of Transport and Storage Casks," in *U.S. Nuclear Regulatory Commission Proceedings of the Twenty-Eighth Water Reactor Safety Information Meeting*, October 23–25, 2000, Bethesda, MD.

B. L. Broadhead and I. C. Gauld, "Rankings of Nuclide Importance in Spent Fuel for Shielding Applications," pp. 702-709 in *ANS2000 Proceedings of Radiation Protection for Our National Priorities: Medicine, the Environment and, the Legacy*, September 17-21, 2000, Spokane, Washington.

J. C. Wagner, M. D. DeHart, and B. L. Broadhead, *Investigation of Burnup Credit Modeling Issues Associated With BWR Fuel*, ORNL/TM-1999/193, October 2000.

2001

B. L. Broadhead and I. C. Gauld, *Joint Report of Foreign Travel to Luxemburg, Luxembourg*, ORNL/FTRs-134426 & 136559, UT-Battelle, LLC, Oak Ridge Natl. Lab., April 17, 2001.

C. V. Parks, B. T. Rearden, M. D. DeHart, B. L. Broadhead, and L. M. Petrie, Jr., *Final EMSP Report U.S. Department of Energy – Development of Nuclear Analysis Capabilities for DOE Waste Management Activities*, April 2001.

C. V. Parks, I. C. Gauld, J. C. Wagner, B. L. Broadhead, M. D. DeHart, and D. D. Ebert, "Research Supporting Implementation of Burnup Credit in the Criticality Safety Assessment of Transport and Storage Casks," pp. 139-161, in *U.S. Nuclear Regulatory Commission Proceedings of the Twenty-Eighth Water Reactor Safety Information Meeting*, October 23-25, 2000, Bethesda, MD (May 2001).

M. L. Williams, B. L. Broadhead, and C. V. Parks, "Eigenvalue Sensitivity Theory for Resonance-Shielded Cross Sections," *Nucl. Sci. Eng.* **138**, 177–191 (2001).

C. V. Parks, B. L. Broadhead, M. D. DeHart, and I. C. Gauld, "Validation Issues for Depletion and Criticality Analysis in Burnup Credit," pp. 167-179 in *Proc. of Technical Committee Meeting on the Evaluation and Review of the Implementation of Burnup Credit in Spent Fuel Management Systems*, July 10-14, 2000, Vienna, Austria (August 2001).

C. V. Parks, J. C. Wagner, I. C. Gauld, B. L. Broadhead, and C. E. Sanders, "U.S. Regulatory Research Program for Implementation of Burnup Credit in Transport Casks," in *Proc. of The 13th International Symposium on the Packaging and Transport of Radioactive Material (PATRAM2001)*, September 3–7, 2001, Chicago, IL.

C. W. Forsberg, L. B. Shappert, P. Byrne, and B. Broadhead, Cermet Transport, Storage, and Disposal Packages Using Depleted Uranium Dioxide and Steel, in *Proc. of The 13th International Symposium on the Packaging and Transport of Radioactive Material (PATRAM2001)*, September 3–7, 2001, Chicago, IL.

2002

B. L. Broadhead, "Estimation of the Dose Effects of Gamma-Ray Streaming Through Cracks in the MVST Storage/Disposal Cask," broadh1m.pdf, Paper Log 57 in *Proc. of American Nuclear Society 12th Biennial RPSD Topical Meeting*, April 14–18, 2002, Santa Fe, NM.

B. L. Broadhead, *Interim Information Report to NRC: Assessment of Planned and Existing Critical Experiments for Burnup Credit Validation*, W6479/IIR-01-05, in preparation.

B. L. Broadhead, C. M. Hopper, R. L. Childs, J. J. Wagschal, and C. V. Parks, "Sensitivity and Uncertainty-Based Criticality Safety Validation Techniques," *Nucl. Sci. Eng.*, in preparation.

2003

B. L. Broadhead, *Recommendations for Shielding Evaluations for Transport and Storage Packages*, NUREG/CR-6802 (ORNL/TM-2002/31), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, May 2003.

Sedat Goluoglu, K. R. Elam, B. T. Rearden, B. L. Broadhead, C. M. Hopper, and C. V. Parks, "Validation of the ¹⁰B Capture Reaction in Nuclear Fuel Casks with Sensitivity Analysis," in *Proc. of ANS: International ANS/ENS 2003 Winter Meeting with cooperation from Nuclear Energy Institute on Nuclear Technology: Achieving Global Economic Growth While Safeguarding the Environment*, November 16–20, 2003, New Orleans, Louisiana. [Summary] *Trans. Am. Nucl. Soc.* **89**, 134–135 (2003).