

## **MARK D. DeHART**

### **LIST OF PUBLICATIONS**

#### **1986**

M. D. DeHart, "Heat Pipe Transient Measurements Incorporating Visual Methods," M.S. Thesis, Texas A&M University, College Station, TX, 1986.

#### **1987**

M. D. DeHart and M. Edenburn, "A Thermal Equilibrium Model for Multi-Megawatt Space Platforms," Fourth Symposium on Space Nuclear Power Systems, Albuquerque, NM, January 1987.

M. D. DeHart and F. R. Best, "Heat Pipe Startup Transient Measurements Including Internal Visual Observations," AIAA 22nd Thermophysics Conference Honolulu, Hawaii, June 1987.

B. Nassersharif, J. S. Peery, and M. D. DeHart, "CENTAR – A Highly Vectorized Code for Analysis of Space Reactor Systems," Third International Symposium on Science and Engineering on Cray Supercomputers, Minneapolis, MN, September 1987.

B. Nassersharif, J. S. Peery, and M. D. DeHart, "CENTAR – Code for Extended Non-linear Transient Analysis of Extraterrestrial Reactor Systems," ANS Winter Meeting, Los Angeles, CA, November 1987.

M. D. DeHart and B. Nassersharif, "Vectorized Performance of a Transient Heat Conduction Model," ANS Meeting, Los Angeles, CA, November 1987.

#### **1988**

B. Nassersharif, J. S. Peery, and M. D. DeHart, "CENTAR – Code for Extended Non-linear Transient Analysis of Extraterrestrial Reactor Systems," Fifth Symposium on Space Nuclear Power Systems, Albuquerque, NM, January 1988.

B. Nassersharif, J. S. Peery, and M. D. DeHart, "Transient Simulation of Space Reactor Systems," Third International Conference on Supercomputing, Boston, MA, May 1988.

## 1991

M. D. DeHart, “Relative Power Calculations for the Inlet Header Break LOPA,” presented to the DOE Independent Review Panel, February 21, 1991.

M. D. DeHart, “Impact of Loss of Negative Pulse as a Single Failure in K-14.1 LOCA-F1 Limits (U),” WSRC-TR-91-173, Westinghouse Savannah River Company, April 1991.

M. D. DeHart, “Physics Codes and Methodologies Used in DEGB LOCA and LOPA Limits” presented to the Defense Nuclear Facilities Safety Board, December 4, 1991.

## 1992

M. D. DeHart, R. E. Pevey, and T. A. Parish, “An Extended Step Characteristic Method for Generalized Geometries,” with T. Parish and R. Pevey, ANS Annual Meeting, Boston, MA, June 1992.

M. D. DeHart, “Extended Step Characteristic Method for Neutron Transport Calculations in Non-Orthogonal Geometries (U),” WSRC-TR-92-363, Westinghouse Savannah River Co., Aiken, SC, July 1992.

M. D. DeHart, “A Discrete Ordinates Approximation to the Neutron Transport Equation Applied to Generalized Geometries,” Ph. D. Dissertation, Texas A&M University, College Station, TX, 1992.

## 1993

M. D. DeHart and R. L. Webb, “Extended Step Characteristic Method for Quarter-Core Gamma Heating Calculations,” ANS Annual Meeting, San Diego, CA, June 1993.

S. M. Bowman, R. Q. Wright, H. Taniuchi, and M. D. DeHart, “Validation of SCALE-4 Criticality Sequences Using ENDF/B-V Data,” ANS 1993 Topical Meeting on Physics and Methods in Criticality Safety, September 19–23, 1993, Nashville, TN.

## 1994

M. D. DeHart, R. E. Pevey, and T. A. Parish, “An Extended Step Characteristic Method for Solving the Transport Equation in General Geometries,” *Nucl. Sci. Eng.* **118**, 79–90 (1994).

M. D. DeHart and S. M. Bowman, *Validation of the SCALE Broad Structure 44-Group ENDF/B-V Cross-Section Library for Use in Criticality Safety Analyses*, NUREG/CR-6102 (ORNL/TM-12460), September 1994.

## **1995**

M. D. DeHart, *SCALE-4 Analysis of Pressurized Water Reactor Critical Configurations: Volume 1 — Summary*, ORNL/TM-12294/V1, Martin Marietta Energy Systems, Inc., Oak Ridge National Laboratory, March 1995.

M. D. DeHart, *SCALE-4 Analysis of Pressurized Water Reactor Critical Configurations: Volume 4 — Three Mile Island Unit 1 Cycle 5*, ORNL/TM-12294/V4, Martin Marietta Energy Systems, Inc., Oak Ridge National Laboratory, March 1995.

S. M. Bowman, M. D. DeHart, and C. V. Parks, “Validation of SCALE-4 for Burnup Credit Applications,” *Nucl. Tech.* **110**, 53–69 (April 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, June 1995.

S. M. Bowman, R. Q. Wright, M. D. DeHart, C. V. Parks, and L. M. Petrie, “Recent Validation Experience with Multigroup Cross-Section Libraries and SCALE,” *ICNC — 95 Fifth International Conference on Nuclear Criticality Safety*, Albuquerque, N.M., September 17–21, 1995.

M. D. DeHart and C. V. Parks, “Issues Related to Criticality Safety Analysis for Burnup Credit Applications,” *ICNC — 95 Fifth International Conference on Nuclear Criticality Safety*, Albuquerque, N.M., September 17–21, 1995.

M. D. DeHart, O. W. Hermann, and C. V. Parks, “Validation of a Method for Prediction of Isotopic Concentrations in Burnup Credit Applications,” *ICNC — 95 Fifth International Conference on Nuclear Criticality Safety*, Albuquerque, N.M., September 17–21, 1995.

M. D. DeHart, O. W. Hermann, and C. V. Parks, “Validation of SCALE Depletion Methods for PWR Spent Fuel Isotopic Characterization,” *Trans. Am. Nucl. Soc.* **73**, 361–63 (1995).

C. W. Forsberg, R. B. Pope, R. C. Ashline, M. D. DeHart, K. W. Childs, J. S. Tang, *DUSCOBS: A Depleted-Uranium Silicate Backfill for Transport, Storage and Disposal of Spent Nuclear Fuel*, ORNL/TM-13045, November 1995.

## 1996

M. D. DeHart, J. S. Tang and C. W. Forsberg, "Shielding Analysis of Depleted Uranium Sand Filler Concept for Spent Fuel Cask Designs," *ANS 1996 Radiation Protection and Shielding Division Topical Meeting*, April 21–25, 1996, Cape Cod, MA.

C. W. Forsberg, R. B. Pope, R. C. Ashline, M. D. DeHart, K. W. Childs, and J. S. Tang, "Depleted-Uranium-Silicate Backfill of Spent Fuel Waste Packages for Improved Repository Performance and Criticality Control," *1996 International High-Level Radioactive Waste Management Conference*, Las Vegas, Nevada, April 29–May 3, 1996.

R. B. Pope, C. W. Forsberg, R. C. Ashline, M. D. DeHart, K. W. Childs, and J. S. Tang, "Benefits and Impacts on the System Elements of the CRWMS of Utilizing Depleted Uranium Silicate Glass as Backfill for Spent Fuel Waste Packages," *1996 International High Level Radioactive Waste Management Conference*, Las Vegas, Nevada, April 29–May 3, 1996.

M. D. DeHart, *Sensitivity and Parametric Evaluations of Significant Aspects of Burnup Credit for PWR Spent Fuel Packages*, ORNL/TM-12973, May 1996.

M. D. DeHart, M. C. Brady and C. V. Parks, *OECD/NEA Burnup Credit Computational Criticality Benchmark Phase I-B Results*, NEA/NSC/DOC(96)-06 (ORNL-6901), June 1996.

M. C. Brady, M. Takano, H. Okuno, A. Nouri, E. Sartori, M. D. DeHart, "Findings of an International Study on Burnup Credit," *Proc. International Conf. on Physics of Reactors, PHYSOR'96*, Volume 4, Mito, Japan, September 16–20, 1996.

M. D. DeHart and O. W. Hermann, *An Extension of the Validation of SCALE (SAS2H) Isotopic Predictions for PWR Spent Fuel*, ORNL/TM-13317, September 1996.

M. D. DeHart and S. M. Bowman, *Analysis of Fresh Fuel Critical Experiments Appropriate for Burnup Credit Validation*, ORNL/TM-12959, October 1995.

## 1997

J. J. Lichtenwalter, S. M. Bowman and M. D. DeHart, *Criticality Benchmark Guide for Light-Water-Reactor Fuel in Transportation and Storage Packages*, NUREG/CR-6361 (ORNL/TM-13211), March 1997.

M. D. DeHart and C. V. Parks, "SCALE Depletion Calculations Based on Two-Dimensional PWR Assembly Flux Solutions," presented at *ANS 1997 Annual Mtg.*, Orlando, FL, June 1–5, 1997. *Trans. Am. Nucl. Soc.* **76**, 53–57 (June 1997).

S.M. Bowman, M. D. DeHart, C. V. Parks, "USLSTATS: Computerized Statistical Methods for Determination of Bias and Subcritical Limits," presented at *ANS 1997 Annual Mtg.*, Orlando, FL, June 1–5, 1997. *Trans. Am. Nucl. Soc.* **76**, 238–241 (June 1997).

M. D. DeHart and R. M. Westfall, Report of Foreign Travel to Paris, France, ORNL/FTR-6250, July 7–13, 1997.

## 1998

O. W. Hermann, M. D. DeHart, B. D. Murphy, *Evaluation of Measured LWR Spent Fuel Composition Data for Use in Code Validation End-User Manual*, ORNL/M-6121, February 1998.

M. D. DeHart, "Flexible Mesh Development for Discrete Ordinates Transport to Accomodate Complex Geometries in Criticality Applications," *Nuclear Criticality Technology Safety Project Workshop*, May 4-8, 1998, Albuquerque, NM

M. D. DeHart, *Report of Foreign Travel to Cadarache, France (05/18–20/1998) and Madrid, Spain (05/21-27/1998)*, ORNL/FTR-6595, May 18–27, 1998 (June 1998).

M. D. DeHart, "An Advanced Deterministic Method for Spent-Fuel Criticality Safety Analysis," *Trans. Am. Nucl. Soc.*, **78**, 170–172 (June 1998).

C. V. Parks, H. R. Dyer, and M. D. DeHart, "Appendix C: A Statistical Technique for Determining Subcritical Limits," *The Radioactive Materials Packaging Handbook: Design, Operations, and Maintenance*, L. B. Shappert, Ed., June 1998, ORNL/M-5003, Oak Ridge National Laboratory, 1998, pp. C-1 – C-8.

C. V. Parks, M. D. DeHart, B. L. Broadhead, C. M. Hopper, L. M. Petrie "Development of Nuclear Analysis Capabilities for DOE Waste Management Activities," pp. 222–223 in *Proceedings of Environmental Management Science Program Workshop*, Chicago, Illinois, July 27–30, 1998, CONF-980736, July 1998 (Poster 113).

O. W. Hermann, and M. D. DeHart, *Validation of SCALE (SAS2H) Isotopic Predictions for BWR Spent Fuel*, ORNL/TM-13315, September 1998.

M. C. Brady, H. Okuno, M. D. DeHart, A. Nouri, and E. Sartori, International Studies on Burnup Credit Criticality Safety By An OECD/NEA Working Group, ORNL/CONF-981003, pp. 624–630 in *Proceedings of the International Conference on the Physics of Nuclear Science and Technology, Vol. 1*, Islandia, NY, October 5–8, 1998.

M. D. DeHart, "Grid Generation and Visualization for Arbitrary Geometry Radiation Transport Methods," *CPED/NAC Visualization Workshop*, December 2, 1998, Oak Ridge, TN.

## **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.

M. D. DeHart, "A Deterministic Study of Deficiencies in the Wigner-Seitz Cell Approximation," *American Nuclear Society, 1999 Annual Meeting, Boston, Massachusetts*, June 6–10, 1999. *Trans. Am. Nucl. Soc.*, **80**, 149–151 (1999).

M. D. DeHart, *Parametric Analysis of PWR Spent Fuel Depletion Parameters for Long-Term Disposal Criticality Safety*, ORNL/TM-1999/99, Lockheed Martin Energy Research Corp., Oak Ridge National Laboratory, August 1999.

M. D. DeHart, "A Deterministic Study of the Deficiency of the Wigner-Seitz Approximation for Pu/MOX Fuel Pins," *M&C'99-Madrid, Mathematics and Computations Meeting*, September 27–30, 1999, Madrid, Spain. [Abstract]

M. D. DeHart, "A Deterministic Study of the Deficiency of the Wigner-Seitz Approximation for Pu/MOX Fuel Pins," pp. 689–699, in *Proc. of M&C'99-Madrid, Mathematics and Computations Meeting*, September 27–30, 1999, Madrid, Spain. [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]

M. D. DeHart, *Report of Foreign Travel to Versailles, France, September 18–25, 1999*, XA 107961 (October 1999).

## **2000**

C. V. Parks, M. D. DeHart, and J. C. Wagner, *Review and Prioritization of Technical Issues Related to Burnup Credit for LWR Fuel*, NUREG/CR-6665 (ORNL/TM-1999/303), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, February 2000.

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.

J. C. Wagner, M. D. DeHart, *Review of Axial Burnup Distribution Considerations for Burnup Credit Calculations*, ORNL/TM-1999/246, Lockheed Martin Energy Research Corp., Oak Ridge National Laboratory, March 2000.

J. C. Wagner, M. D. DeHart, "Investigation of BWR Depletion Calculations with SAS2H," *Trans. Am. Nucl. Soc.* **82**, 173–176 (June 2000) 36f.pdf.

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, Maryland.

M. D. DeHart, "A Statistical Method for Estimating the Net Uncertainty in the Prediction of  $k$  Based on Isotopic Uncertainties," *ANS/ENS 2000 International Winter Meeting and Embedded Topical Meetings*, November 12–16, 2000, Washington, D.C.

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.

M. D. DeHart, *Report of Foreign Travel to Issy-les-Moulineaux, France, September 11–16, 2000*, FTR XA 125640, October 2000.

## **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).

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, M. D. DeHart and J. C. Wagner, “Phenomena and Parameters Important to Burnup Credit,” pp. 233–247 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, M. D. DeHart, and I. C. Gauld, *Interim Information Report to NRC: Technical Recommendations for the Criticality Safety Review of PWR Storage and Transportation Casks That Use Burnup Credit*, W6479/IIR-01-04, Rev. 1.

M. D. DeHart, *A Stochastic Method for Estimating the Effect of Isotopic Uncertainties in Spent Nuclear Fuel*, ORNL/TM-2001/83, UT-Battelle, LLC, Oak Ridge National Laboratory, September 2001.

M. D. DeHart, “SAS2D — A Two-Dimensional Depletion Sequence for Characterization of Spent Nuclear Fuel,” 35583.pdf in *Proc. of 2001 ANS Embedded Topical Meeting on Practical*

*Implementation of Nuclear Criticality Safety*, November 11–15, 2001, Reno, NV [ANS Order No.: 700284; ISBN: 0-89448-659-4].

C. E. Sanders and M. D. DeHart, “Comparison of Computational Estimations of Reactivity Margin From Fission Products and Minor Actinides in PWR Burnup Credit,” 35765.pdf in *Proc. of 2001 ANS Embedded Topical Meeting on Practical Implementation of Nuclear Criticality Safety*, November 11–15, 2001, Reno, NV [ANS Order No.: 700284; ISBN: 0-89448-659-4].

## **2002**

C. E. Sanders and M. D. DeHart, “Computational Benchmark of the 2-D Depletion Sequence SAS2D for Characterization of Spent Nuclear Fuel,” in *Proc. of International Youth Nuclear Congress: Youth, Future, Nuclear*, April 16–20, 2002, Daejeon, KOREA.

C. E. Sanders and M. D. DeHart, “Computational Benchmark of SAS2D Against Spent Fuel Samples From the Takahama-3 Reactor,” in *Proc. of American Nuclear Society 2002 Annual Meeting “The Revival of the Nuclear Energy Option”*, June 9–13, 2002, Hollywood, FL. *Trans. Am. Nucl. Soc.* **86**, 100–102 (June 2002).

M. D. DeHart, *Report of Foreign Travel to Paris, France, September 6-12, 2000, TA#160736*, October 14, 2002.

M. D. DeHart, “New Two-Dimensional Deterministic Criticality Safety Capabilities in SCALE 5,” in *Proc. of American Nuclear Society 2002 Winter Meeting “Building the World Nuclear Community – Strategies for the Deployment of New Nuclear Technologies”*, November 17–21, 2002, Washington, DC. *Trans. Am. Nucl. Soc.* **87**, 272–273 (2002).

S. M. Bowman, D. F. Hollenbach, M. D. DeHart, B. T. Rearden, I. C. Gauld and S. Goluoglu, “An Overview of What's New in SCALE 5,” in *Proc. of American Nuclear Society 2002 Winter Meeting “Building the World Nuclear Community — Strategies for the Deployment of New Nuclear Technologies”*, November 17–21, 2002, Washington, DC. *Trans. Am. Nucl. Soc.* **87**, 265–268 (2002).

## **2003**

J. C. Wagner, M. D. DeHart and C. V. Parks, *Recommendations for Addressing Axial Burnup in PWR Burnup Credit Analyses*, NUREG/CR-6801 (ORNL/TM-2001/273), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, March 2003.

Z. Zhong, T. Downar and M. DeHart, “Benchmarking the U.S. NRC Neutronic Codes NEWT and PARCS with the VENUS-2 MOX Critical Experiments,” 097.pdf in *Proc. of Nuclear Mathematical and Computational Sciences: A Century in Review, A Century Anew*, April 6–11, 2003, LaGrange Park, IL (2003).

S. M. Bowman and M. D. DeHart, Joint Report of Foreign Travel to Paris, France (06/18–28/2003), FTR 170461 & 170462 (July 2003).

M. D. DeHart, Z. Zhong, and T. J. Downar, “TRITON: An Advanced Lattice Code for MOX Fuel Calculations,” 14-01.pdf in *Proc. of American Nuclear Society, Advances in Nuclear Fuel Management III*, October 5-8, 2003, Hilton Head Island, South Carolina.

S. M. Bowman, D. F. Hollenbach, M. D. DeHart, B. T. Rearden, I. C. Gauld, and S. Goluoglu, “SCALE 5: Powerful New Criticality Safety Analysis Tools,” pp. 447-453 in *Proc. of The 7<sup>th</sup> International Conference on Nuclear Criticality Safety (ICNC2003)*, October 20-24, 2003, Tokai-mura, Japan.