William Jay (B.J.) Marshall, PhD

Business Address:

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EDUCATION

University of Tennessee-Knoxville
Doctor of Philosophy in Nuclear Engineering, December 2017
Dissertation: "Determination of Critical Experiment Correlations Via the Monte Carlo Sampling Technique"
Cumulative Graduate GPA: 3.82/4.0

Master of Science in Nuclear Engineering, August 2001
Thesis: "Power Distribution Calculations in the High Flux Isotope Reactor for Various Control Blade Tantalum Loadings"
Graduate GPA: 3.72/4.0

University of Missouri-Rolla (*Now Missouri University of Science & Technology*)
Bachelor of Science in Nuclear Engineering, December 1999 (Cum Laude)
Undergraduate GPA: 3.41/4.0

WORK EXPERIENCE

June 2010–Present

Senior R&D Staff (January 2017 – Present) / R&D Staff (June 2010 – December 2016)
Interim Group Leader, Nuclear Criticality Group (October 2020 – Present)
Nuclear Criticality Group; Nuclear Energy and Fuel Cycle Division

- Perform research supporting burnup credit basis for PWR and BWR SNF
  - PI for $2+ million, five year project to investigate technical basis for BWR BUC
  - Support for PWR and BWR methodology development in UNF-ST&DARDS
- Research and expand application of sensitivity/uncertainty methods to NCS applications
  - Generate published guidance on direct perturbation calculations supporting TSUNAMI-3D
  - Develop and deliver material for NCSP one-day introductory course on S/U methods
  - Organize session on past, present, and future of S/U methods in NCS applications
- Lead SCALE criticality safety validation efforts for cross sections and covariance data
  - Elected member of the NCSP Nuclear Data Advisory Group (NDAG) as of March 2019
  - Attended CSEWG meetings, particularly the Validation and Covariance Committees
- Develop, maintain, and deliver SCALE training:
  - SCALE Criticality Safety Calculations (KENO V.a and KENO-VI)
  - Sensitivity/Uncertainty Analysis for NCS Applications and Validation (TSUNAMI)
  - SCALE Computational methods for Burnup Credit (STARBUCS, et al.)
  - Lead for SCALE Training, Spring 2015 – Fall 2016
  - Developed scope and customized material for multiple external customers
- Mentor graduate and summer students
  - Primary mentor for two Master of Science degrees (University of Tennessee-Knoxville)
  - Primary mentor for several summer students, including training rotations from USNA
- Instructor for NCSP Hands-on criticality safety practitioner course, February 2017 – present
- Support development and testing of SCALE criticality safety, sensitivity/uncertainty, and nuclear data developments with software quality assurance plan

WORK EXPERIENCE (continued)

February 2018–March 2020

Lecturer

University of Tennessee-Knoxville, Nuclear Engineering Department, Knoxville, TN

- Prepare and present material related to computer code use, Monte Carlo method, computer code testing, validation, and nuclear data use in nuclear criticality safety in graduate course
- Develop and administer homework assignment and test to assess student performance

November 2008–May 2010

Product Manager/Lead Engineer

Westinghouse Electric Company

- Provided technical and business leadership to spent fuel pool criticality safety product line
- Participated in industry-wide NEI forum with NRC
- Supervised work on new analyses and licensing support for past analyses
- Developed and delivered SFP NCS training with other qualified personnel

July 2006–October 2008

Senior Core Design Engineer

Westinghouse Electric Company

- Performed and verified PWR core reload analyses, assisted improvement of core modeling
- Executed spent fuel pool criticality safety analyses
- Mentored new employees in core design and criticality safety

November 2001–July 2006

Design Engineer

Knolls Atomic Power Laboratory

- Assisted in new reactor designs
- Performed 2D and 3D Monte Carlo calculations
- Helped develop and provide RACER Monte Carlo code training

January 2000–August 2001

Graduate Research Assistant

University of Tennessee

- Performed research on High Flux Isotope Reactor, using SCALE and DORT for core modeling
- Lectured on MCNP4C at Tennessee Industries Week

June 1999–August 1999

Summer Intern

Oak Ridge National Laboratory

- Prepared experimental reports from TSF for inclusion in SINBAD database
- Developed MCNP4B model of shielding benchmark including the Yayoi reactor beam line
- Upgraded output from NRC code HABIT

September 1998–December 1999

Student Health Physics Technician

University of Missouri-Rolla (Now Missouri University of Science & Technology)

- Performed radiation and contamination surveys
- Performed meter and dosimeter calibrations
- Trained new technicians

PROFESSIONAL ACTIVITIES

- Involved with American Nuclear Society (ANS)
    - Elected to ANS Nuclear Criticality Safety Division Executive Board, June 2019 – June 2022
    - Session organizer for multiple sessions at ANS meetings
    - Invited panelist for Ethics in Nuclear Engineering and Design, November 2018
- Elected a US voting member for OECD/NEA Working Party on Nuclear Criticality Safety in 2021
- Vice Chairperson of International Criticality Safety Benchmark Evaluation Project Technical Review Group, June 2022 - Present
- Co-chair of Nuclear Criticality Safety track at PHYSOR 2022
- Reviewer for numerous conferences and several journals
- Session chair for multiple conference sessions

AWARDS

ORNL Significant Event Award in 2013
Best paper in session at 2016 ANS Annual Meeting

PUBLICATIONS

W.J. Marshall, O.M. Belcher, N.H. Byrne, L.E. de Leon, M.N. Solis, T.M. Greene, and S.R. Blair, "Expanded Validation of Uranium Systems with the KENO Monte Carlo Codes and SCALE 6.2.4," *Proceedings of PHYSOR 2022*, 2664-2673, Pittsburgh, PA, (2022).

W.J. Marshall and T.M. Greene, "Cumulative χ^2 Metric for ENDF/B-VII.1 and ENDF/B-VIII.0 in SCALE 6.3b9," *Trans. Am. Nucl. Soc.* **125**, 696-699 (2021).

A.M. Shaw and W.J. Marshall, "Validation of KENO Delayed Neutron Fraction Capabilities," *Trans. Am. Nucl. Soc.* **125**, 686-688 (2021).

H.S. Abdel-Khalik, D. Huang, U. Mertyurek, W.J. Marshall, and W.A. Wieselquist, "Overview of the Tolerance Limit Calculations with Application to TSURFER," *Energies* **14**(21): 7092 (2021).

W.J. Marshall and A. Lang, "Sensitivity Calculations for Systems with Polyethylene Reflector Materials Using CLUTCH," *Trans. Am. Nucl. Soc.* **124**, 376-378 (2021).

A. Lang, A.M. Shaw, C.W. Chapman, and W.J. Marshall, "Discovery of AMPX Thermal Scattering Law Processing Issue for Solid Moderators," *Trans. Am. Nucl. Soc.* **124**, 368-371 (2021).

T.M. Greene, W.J. Marshall, and J.B. Clarity, "Reducing Direct Perturbation Uncertainty for High-Sensitivity Coefficients," *Trans. Am. Nucl. Soc.* **124**, 372-375 (2021).

R.A. Lefebvre, S.R. Johnson, W.J. Marshall, and C. Celik, "3D Model Visual Verification and Mesh-Based Data Analysis in Fulcrum," *Trans. Am. Nucl. Soc.* **124**, 643-646 (2021).

V. Sobes, A.M. Holcomb, W.J. Marshall, T.M. Greene, D. Wiarda, and W.A. Wieselquist, "Augmented ENDF/B-VIII.0 Covariance Library for SCALE 6.3," *Annals of Nucl. Energy*, **160** (2021).

R.A. Hall, W.J. Marshall, E. Eidelpes, and B.M. Hom, "Assessment of Critical Experiment Benchmark Applicability to a Large-Capacity HALEU Transportation Package Concept," *Nucl. Sci. & Eng.* **195(3)**, 310-319 (2021).

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K.B. Bekar, J.B. Clarity, M.N. Dupont, R.A. Lefebvre, W.J. Marshall, and E.M. Saylor, "KENO-VI Primer: Performing Calculations Using SCALE's Criticality Safety Analysis Sequence (CSAS6) with Fulcrum," ORNL/TM-2020/1601 (2020).

K.B. Bekar, J.B. Clarity, M.N. Dupont, R.A. Lefebvre, W.J. Marshall, and E.M. Saylor, "KENO V.a Primer: Performing Calculations Using SCALE's Criticality Safety Analysis Sequence (CSAS5) with Fulcrum," ORNL/TM-2020/1664 (2020).

W.J. Marshall, J.B. Clarity, and B.T. Rearden, "A Review of TSUNAMI Applications," *Trans. Am. Nucl. Soc.* **123**, 795-798 (2020).

W.J. Marshall and B.D. Brickner, "Improved Runtime Performance in KENO-VI Models Using Arrays and Holes," *Trans. Am. Nucl. Soc.* **123**, 937-940 (2020).

K.B. Bekar, J.B. Clarity, M.N. Dupont, R.A. Lefebvre, W.J. Marshall, and E.M. Saylor, "Updated Primers Generated for SCALE 6.2 for KENO V.a and KENO-VI," *Trans. Am. Nucl. Soc.* **123**, 934-936 (2020).

B.T. Rearden, W.J. Marshall, and W.A. Wieselquist, "Development of SCALE Tools for Sensitivity and Uncertainty Analysis Methodology Implementation (TSUNAMI) from SCALE 5 through SCALE 6.2," *Trans. Am. Nucl. Soc.* **123**, 799-803 (2020).

J.B. Clarity, W.J. Marshall, B.T. Rearden, and I. Duhamel, "Selected Uses of TSUNAMI in Critical Experiment Design and Analysis," *Trans. Am. Nucl. Soc.* **123**, 804-807 (2020).

J.B. Clarity, S.W.D. Hart, W.A. Wieselquist, and W.J. Marshall, "VADER: A Tool for Criticality Safety Validation," *Trans. Am. Nucl. Soc.* **123**, 931-933 (2020).

J. Alwin, F. Brown, J. Clarity, I. Duhamel, F. Fernex, L. Leal, R. Little, B.J. Marshall, M. Rising, E. Saylor, and K. Spencer, "S/U Comparison Study with a Focus on USLs," *Trans. Am. Nucl. Soc.* **123**, 780-783 (2020).

W. Wieselquist, J. Bess, D. Bowen, I. Duhamel, I. Hill, N. Leclaire, W. Marshall, C. Percher, E. Saylor, and S. Tsuda, "Initial Efforts Organizing WPNCS SG-8: Preservation of Expert Knowledge and Judgement Applied to Criticality Benchmarks," *Trans. Am. Nucl. Soc.* **123**, 895-897 (2020).

U. Mertyurek, H.S. Abdel-Khalik, and W.J. Marshall, "MAPPER – A Novel Capability to Support Nuclear Model Validation and Mapping of Biases and Uncertainties," Proceedings of PHYSOR 2020 (2020).

B.D. Hiscox, B.R. Betzler, V. Sobes, and W.J. Marshall, "Neutronic Benchmarking of Small Gas-Cooled Systems," Proceedings of PHYSOR 2020 (2020).

W.J. Marshall, T.M. Greene, B.D. Brickner, and R.A. Hall, "Description and Use of SCALE Sampler Parametric Capability for Engineering Analysis and Optimization," *Trans. Am. Nucl. Soc.* **122**, 471-474 (2020).

W.J. Marshall, J.B. Clarity, and K. Banerjee, "Performing k_{eff} Validation of As-Loaded Criticality Safety Calculations using UNF-ST&DARDS: Sensitivity Calculations," *Trans. Am. Nucl. Soc.* **122**, 479-482 (2020).

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W.J. Marshall, J.B. Clarity, and K. Banerjee, "Performing k_{eff} Validation of As-Loaded Criticality Safety Calculations using UNF-ST&DARDS: Applicable Experiment Selection," *Trans. Am. Nucl. Soc.* **122**, 475-478 (2020).
W.J. Marshall, "Bias Between ENDF/B-VIII.0 and ENDF/B-VII.1 for LEU Pin Array Systems," *Trans. Am. Nucl. Soc.* **121**, 952-955 (2019).

E.M. Saylor and W.J. Marshall, "Sensitivity/Uncertainty Comparison Study: Oak Ridge National Laboratory Results," *Trans. Am. Nucl. Soc.* **121**, 948-951 (2019).

V. Sobes, W.J. Marshall, D. Wiarda, F. Bostelmann, A.M. Holcomb, and B.T. Rearden, "ENDF/B-VIII.0 Augmented Covariance Data: The First Iteration," *Trans. Am. Nucl. Soc.* **121**, 1365-1368 (2019).

F. Bostelmann, A.M. Holcomb, W.J. Marshall, V. Sobes, and B.T. Rearden, "Impact of the ENDF/B-VIII.0 Library on Advanced Reactor Simulations," *Trans. Am. Nucl. Soc.* **121**, 1369-1372 (2019).

I. Duhamel, J.L. Alwin, F.B. Brown, M.E. Rising, K.Y. Spencer, D. Heinrichs, S. Kim, W.J. Marshall, and E.M. Saylor, "International Criticality Benchmark Comparison for Nuclear Data Validation," *Trans. Am. Nucl. Soc.* **121**, 873-876 (2019).

W.J. Marshall, B.J. Ade, I.C. Gauld, G. Ilas, U. Mertyurek, J.B. Clarity, G. Radulescu, B.R. Betzler, S.M. Bowman, and J.S. Martinez-Gonzalez, "Overview of the Recent BWR Burnup Credit Project at Oak Ridge National Laboratory," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

W.J. Marshall, J.B. Clarity, J. Yang, U. Mertyurek, M.A. Jessee, and B.T. Rearden, "Initial Application of TSUNAMI for Validation of Advanced Fuel Systems," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

W.J. Marshall, E.M. Saylor, A.M. Holcomb, D. Wiarda, and T.M. Greene, "Validation of KENO V.a and KENO-VI in SCALE 6.3 Beta 3 Using ENDF/B-VII.1 and ENDF/B-VIII Libraries," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

F. Sommer, W.J. Marshall, and M. Stuke, "Correlation of HST-001 due to Uncertain Technical Parameters – Comparison of Results from SUnCISTT, Sampler, and DICE," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

J.B. Clarity and W.J. Marshall, "The Influence of Changes in Nuclear Covariance Data on the Calculation of c_k for Highly Enriched Uranium Solution Systems," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

M. Stuke, A. Hoefer, O. Buss, M. Chernykh, G. Dobson, J. Dyrda, T. Ivanova, N. Leclaire, W.J. Marshall, D. Mennerdahl, B.T. Rearden, P. Smith, F. Sommer, and S. Tittelbach, "UACSA Phase IV: Role of Integral Experiment Covariance Data for Criticality Safety Validation – Summary of Selected Results," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

J. B. Clarity and W.J. Marshall, "Assessment of Normality for Criticality Safety Bias and Bias Uncertainty Calculation," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

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J.B. Clarity, T.M. Miller, W.J. Marshall, and D.E. Mueller, "Detailed Design of an Epithermal/Intermediate Critical Experiment using the Sandia National Laboratories Critical Facility," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

I. Duhamel, J.L. Alwin, F.B. Brown, M.E. Rising, K.Y. Spencer, D. Heinrichs, S. Kim, W.J. Marshall, and E.M. Saylor, "International Benchmarks Intercomparison Study for Codes and Nuclear Data Validation," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

K. Banerjee, J.B. Clarity, H. Liljenfeldt, W.J. Marshall, P. Miller, and J.M. Scaglione, "Criticality Safety Analysis of Spent Nuclear Fuel Canisters using As-loaded Configurations," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

T.M. Greene, W.J. Marshall, and G.I. Maldonado, "Analysis of D_2O Benchmark Criticality Experiments," *Proceedings of the 11th International Conference on Nuclear Criticality Safety (ICNC2019)*, Paris, France (2019).

W.J. Marshall, J.B. Clarity, and S.M. Bowman, "Validation of k_{eff} Calculations for Extended BWR Burnup Credit Calculations," *Trans. Am. Nucl. Soc.* **120**, 554-557 (2019).

W.J. Marshall, J. Yang, U. Mertyurek, and M.A. Jessee, "Preliminary TSUNAMI Assessment of the Impact of Accident Tolerant Fuel Concepts on Reactor Physics Validation," *Trans. Am. Nucl. Soc.* **120**, 500-503 (2019).

J.B. Clarity, W.J. Marshall, K. Banerjee, and J.M. Scaglione, "A Method for Performing k_{eff} Validation of As-Loaded Criticality Safety Calculations Using UNF-ST&DARDS," *Trans. Am. Nucl. Soc.* **120**, 504-507 (2019).

B.T. Rearden, W.J. Marshall, J.B. Clarity, A.M. Holcomb, F. Bostelmann, and J.M. Scaglione, "Initial Investigations of the Criticality Safety Validation Basis for HA-LEU Transportation," *Trans. Am. Nucl. Soc.* **120**, 517-520 (2019).

J.B. Clarity, W.J. Marshall, and E.M. Saylor, "User Experiences with ICSBEP Distributed Sensitivity Data Profiles with the SCALE Sensitivity and Uncertainty Methods as of Winter 2019," *Trans. Am. Nucl. Soc.* **120**, 550-553 (2019).

W.J. Marshall, J.B. Clarity, and S.M. Bowman, "Validation of k_{eff} Calculations for Extended BWR Burnup Credit," NUREG/CR-7252 (ORNL/TM-2018/797), prepared for the U.S. Nuclear Regulatory Commission by Oak Ridge National Laboratory, Oak Ridge, TN (2018).

W.J. Marshall and A.M. Holcomb, "A Testing Trifecta: Data, Codes, and Evaluations," *Trans. Am. Nucl. Soc.* **119**, 724-727 (2018).

W.J. Marshall, J.B. Clarity, and E.M. Saylor, "Sensitivity Calculations for Systems with Fissionable Reflector Materials Using TSUNAMI," *Trans. Am. Nucl. Soc.* **119**, 787-790 (2018).

E.L. Jones, J.B. Clarity, W.J. Marshall, B.T. Rearden, and G.I. Maldonado, "A Case Study in the Application of TSUNAMI-3D – Part 3, Continuous Energy – Iterated Fission Probability Method," *Trans. Am. Nucl. Soc.* **119**, 845-848 (2018).

PUBLICATIONS (continued)

E.M. Saylor, W.J. Marshall, J.B. Clarity, Z.J. Clifton, and B.T. Rearden, *Criticality Safety Validation of SCALE 6.2.2*, ORNL/TM-2018/884, Oak Ridge, TN (2018).

W.J. Marshall, "The Case for and Against a Gadolinium Bias in SCALE: Opening Arguments," *Trans. Am. Nucl. Soc.* **118**, 554-557 (2018).

W.J. Marshall and E.M. Saylor, "Enhanced Engineering Analyses with Visualization of Geometry and Mesh-Based Data in Fulcrum," *Trans. Am. Nucl. Soc.* **118**, 987-990 (2018).

Z.J. Clifton, W.J. Marshall, and I. Hill, "Benchmark Model Temperatures Incorporated into DICE," *Trans. Am. Nucl. Soc.* **118**, 543-546 (2018).

E.M. Saylor, W.J. Marshall, Z.J. Clifton, J.B. Clarity, and B.T. Rearden, "Validation of KENO V.a and KENO-VI in SCALE 6.2.2 using ENDF/B-VII.0 and ENDF/B-VII.1 Libraries," *Trans. Am. Nucl. Soc.* **118**, 571-574 (2018).

C.M. Perfetti, B.T. Rearden, and W.J. Marshall, "Estimating Computational Biases for Criticality Safety Applications with Few Neutronically Similar Benchmarks," *Trans. Am. Nucl. Soc.* **118**, 561-564 (2018).

B.J. Ade, W.J. Marshall, G. Ilas, B.R. Betzler, and S.M. Bowman, "Impact of Operating Parameters on Extended BWR Burnup Credit," NUREG/CR-7240 (ORNL/TM-2017/46), prepared for the U.S. Nuclear Regulatory Commission by Oak Ridge National Laboratory, Oak Ridge, TN (2018).

J.B. Clarity, K. Banerjee, H.K. Liljenfeldt, and W.J. Marshall, "As-Loaded Criticality Margin Assessment of Dual-Purpose Canisters Using UNF-ST&DARDS," *Nucl. Tech.*, **199**(3), 245 – 275 (2017).

W.J. Marshall, D.E. Mueller, J.B. Clarity, and S.M. Bowman, "Development of Criticality Safety Validation Guidance for NRC-Regulated Activities," *Proceedings of NCSD 2017: Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations*, Carlsbad, NM (2017).

W.J. Marshall, B.T. Rearden, and R.E. Pevey, "Determination of Critical Experiment Correlations for Experiments Involving Arrays of Low-Enriched Fuel Rods," *Proceedings of NCSD 2017: Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations*, Carlsbad, NM (2017).

W.J. Marshall, B.T. Rearden, and R.E. Pevey, "Determination of Critical Experiment Correlations for Experiments Involving Highly Enriched Uranium Solutions," *Proceedings of NCSD 2017: Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations*, Carlsbad, NM (2017).

B.J. Ade, W.J. Marshall, and S.M. Bowman, "The Effect of Modeling Assembly-Specific Parameters in Extended BWR Burnup Credit Analyses," *Proceedings of NCSD 2017: Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations*, Carlsbad, NM (2017).

J.B. Clarity, K. Banerjee, W.J. Marshall, and H.K. Liljenfeldt, "A Burnup Credit Approach for Margin Estimation of Loaded Boiling Water Reactor Canisters in UNF-ST&DARDS," *Proceedings of NCSD 2017: Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations*, Carlsbad, NM (2017).

PUBLICATIONS (continued)

A. Holcomb, D. Wiarda, and W.J. Marshall, "ENDF/B-VIII.0 Testing With AMPX and SCALE," *Proceedings of NCSD 2017: Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations*, Carlsbad, NM (2017).

R.A. Lefebvre and W.J. Marshall, "Template Engine Applied to Rapid Modeling," *Proceedings of NCSD 2017: Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations*, Carlsbad, NM (2017).

B.T. Rearden, B.R. Betzler, M.A. Jessee, W.J. Marshall, U. Mertyurek, and M.L. Williams, "Accuracy and Runtime Improvements with SCALE 6.2," *Proceedings of International Conference on Mathematics and Computational Methods Applied to Nuclear Science & Engineering*, Jeju, Korea (2017).

C.M. Perfetti, B.T. Rearden, and W.J. Marshall, "Diagnosing Undersampling Biases in Monte Carlo Eigenvalue and Flux Tally Estimates," *Nucl. Sci. and Eng.*, **185**(1) 139 – 158 (2017).

E.L. Jones, W.J. Marshall, B.T. Rearden, M.E. Dunn, and G.I. Maldonado, "A Case Study in the Application of TSUNAMI-3D – Part 2, Continuous Energy," *Trans. Am. Nucl. Soc.* **115**, 677-680 (2016).

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J.A. Hanna, R.A.L. Rosenthal, W.J. Marshall, D.E. Mueller, E.L. Jones, S.R. Blair, and B.T. Rearden, "Validation for ^{233}U-Fueled Systems in KENO V.a in SCALE 6.2," *Trans. Am. Nucl. Soc.* **115**, 665-668 (2016).

W.J. Marshall, B.J. Ade, and S.M. Bowman, "Study of Axial Burnup Profile Effects on BWR Burnup Credit," *Proceedings of the 18th International Symposium on the Packaging and Transportation of Radioactive Materials (PATRAM 2016)*, Kobe, Japan (2016).

W.J. Marshall, B.J. Ade, S.M. Bowman, and J.S. Martinez-Gonzalez, "Axial Moderator Density Distributions, Control Blade Usage, and Axial Burnup Distributions for Extended BWR Burnup Credit," NUREG/CR-7224 (ORNL/TM-2015/544), prepared for the U.S. Nuclear Regulatory Commission by Oak Ridge National Laboratory, Oak Ridge, TN (2016).

W.J. Marshall, B.J. Ade, and S.M. Bowman, "Apparent Monte Carlo Source Convergence Problem with BWR Fuel Depleted with Partial Control Blade Insertion," *Trans. Am. Nucl. Soc.* **114**, 475-478 (2016).

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B.J. Ade, W.J. Marshall, J.S. Martinez, and S.M. Bowman, "Effects of Control Blade History, Axial Coolant Density Profiles, and Axial Burnup Profiles on BWR Burnup Credit," *Proceedings of PHYSOR 2016*, Sun Valley, ID (2016).

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W.J. Marshall, B.T. Rearden, and E.L. Jones, "Validation of SCALE 6.2 Criticality Calculations Using KENO V.A and KENO-VI," *Proceedings of International Conference on Nuclear Criticality Safety*, Charlotte, NC (2015).

W.J. Marshall, M.L. Williams, D. Wiarda, B.T. Rearden, M.E. Dunn, D.E. Mueller, J.B. Clarity, and E.L. Jones, "Development and Testing of Neutron Cross Section Covariance Data for SCALE 6.2," *Proceedings of International Conference on Nuclear Criticality Safety*, Charlotte, NC (2015).

D.E. Mueller, D.G. Bowen, and W.J. Marshall, "Addressing Fission Product Validation in MCNP Burnup Credit Criticality Calculations," *Proceedings of International Conference on Nuclear Criticality Safety*, Charlotte, NC (2015).

V. Sobes, B.T. Rearden, D.E. Mueller, W.J. Marshall, J.M. Scaglione, M.E. Dunn, "Upper Subcritical Limit Calculations Based on Correlated Experimental Data," *Proceedings of International Conference on Nuclear Criticality Safety*, Charlotte, NC (2015).

J.S. Martinez-Gonzalez, B.J. Ade, S.M. Bowman, I.C. Gauld, G. Ilas, W.J. Marshall, "Impact of modeling Choices on Inventory and In-Cask Criticality Calculations for Forsmark3 BWR Spent Fuel," *Proceedings of International Conference on Nuclear Criticality Safety*, Charlotte, NC (2015).

B.J. Ade, W.J. Marshall, S.M. Bowman, I.C. Gauld, G. Ilas, and J.S. Martinez-Gonzalez, "Coolant Density and Control Blade History Effects in Extended BWR Burnup Credit," *Proceedings of International Conference on Nuclear Criticality Safety*, Charlotte, NC (2015).

B.T. Rearden, K.B. Bekar, C. Celik, K.T. Clarno, M.E. Dunn, S.W.D. Hart, A.M. Ibrahim, S.R. Johnson, B.R. Langley, J.P. Lefebvre, R.A. Lefebvre, W.J. Marshall, U. Mertyurek, D.E. Mueller, D.E. Peplow, C.M. Perfetti, L.M. Petrie Jr., A.B. Thompson, D. Wiarda, W.A. Wieselquist, and M.L. Williams, "Criticality Safety Enhancements For Scale 6.2 And Beyond," *Proceedings of International Conference on Nuclear Criticality Safety*, Charlotte, NC (2015).

E.L. Jones, G.I. Maldonado, W.J. Marshall, C.M. Perfetti, and B.T. Rearden, "Investigation of the Continuous-Energy Sensitivity Methods in SCALE 6.2 Using TSUNAMI-3D," *Proceedings of International Conference on Nuclear Criticality Safety*, Charlotte, NC (2015).

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