Donald E. Mueller
Bldg 5700, MS 6170
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, TN 37831-6170

May 6, 2008
(865) 576-4121
MuellerDE@ornl.gov

Summary: Nuclear Engineer (MS) with 24 years experience in Nuclear Core Reload Design, Nuclear Criticality Safety and Nuclear Power Plant Training Simulator Engineering.

Education:

1984, M.S.	Nuclear Engineering	University of Illinois
1983, B.S.	Nuclear Engineering	University of Illinois - "Highest Honors"
1981, A.S.	Engineering Science	Parkland Community College

Experience:

2004-present Senior R&D Staff, Radiation Transport and Criticality Group, Nuclear Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN.

Providing general nuclear engineering support and nuclear criticality safety support to the NRC, DOE, ORNL, Sandia National Laboratories (SNL), and other organizations. Support included:

- Supporting DOE/OCRWM YMP post-closure burnup credit Nuclear Criticality Safety (NCS) work.
- Providing support to SNL for recertification of the PAT-1 shipping package.
- Assisted NRC Office of Nuclear Reactor Regulation revision of Standard Review Plan Section 9.1.1, Criticality Safety of Fresh and Spent Fuel Storage and Handling.
- Providing NCS support to Spent Fuel Project Office, Office of Nuclear Material Safety and Safeguards, NRC.
- Provided evaluation of the French HTC critical experiment data in support of efforts to procure the data for use in the U.S.
- Provided support for the DOE/RW Transportation Burnup Credit Project. Support involved applying SCALE criticality and sensitivity analysis sequences to PWR and BWR burnup credit models, processing of commercial spent nuclear fuel data from the DOE Form RW-859 (2002) Nuclear Fuel Data file, evaluation of various burnup credit analysis strategies by comparison of SCALE calculation results with the RW-859 data, and evaluation of critical experiments for use in burnup credit calculation validation.
- Assisting with presentation of SCALE TSUNAMI training classes.

1992-2004 Nuclear Criticality Safety Specialist, NCS Staff, Operational Safety Services Division, Oak Ridge National Laboratory, Oak Ridge, TN.

Provided qualified (per DOE-approved ORNL NCS Staff Training and Qualification Plan) NCS support as follows for diverse fissionable material operations (e.g., processing, storage, handling, transport, liquid waste and solid waste, legacy burials, etc.):

- Performed and reviewed process evaluations.
- Assisted in incorporation of NCS requirements into operating procedures and Nuclear Facility safety basis documents such as DSAs, SARs, BIOs, HSs, PHSs, TSRs, and USQDs.
- Performed and reviewed NCS and radiation shielding calculations using SCALE and MCNP.
- Performed independent review of CAAS placement MCNP calculations.
- Prepared and presented NCS training to workers and supervisors.
- Served as the Research Reactors Division Criticality Safety Officer.
- Provided on-call emergency response for ORNL Emergency Operations Technical Support Cadre.
- Provided criticality safety audit support at ORNL, Y12, and at Fernald.
- Provided support for and performed compliance surveys.
- Performed initial and quarterly verification of SCALE and MCNP on NCS staff workstations.
- ORNL NCS Group Workstation and NCS Software Administrator.
- Provided UNIX and programming support to ORNL NCS staff.
- Prepared and gave NCS presentations to DOE HQ ES&H, DNFSB Staff, EFCOG and a NCTSP Workshop.

Donald E. Mueller
Bldg 5700, MS 6170
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, TN 37831-6170

May 6, 2008
(865) 576-4121
MuellerDE@ornl.gov

1998-2000 Nuclear Engineering consultant providing support for maintaining training simulators at McGuire and Catawba Nuclear Power Stations

1988- 1992 Sr. Engineer, Simulator Department, Process Control Division, Westinghouse, Pittsburgh, PA

As a Simulator Engineer, modeled nuclear reactor, incore and excore instrumentation, control rod position and position indication systems, and radiation transport and detection for PWR training simulators. Models were primarily (99%) FORTRAN code. Modeling included interfaces with real control boards and controls in remote cabinets. Models functioned in real-time and simulated transient normal and accident conditions (e.g., LOCA, steam-line break, etc.).

Project Lead for creation and installation of a "distributed" radioactive material transport and radiation detection model for the V.C. Summer training simulator.

Provided and installed major upgrades to reactor core cycle-specific "tuning" tool (EZTUNE).

Duties also included project engineering functions and a four-month stint as the acting Manager of the Mathematical Modeling Group.

1984-1988 Engineer, Core Engineering Department, Commercial Nuclear Fuels Division (CNFD), Westinghouse, Pittsburgh, PA

Duties were split 50/50 between:

1) Nuclear reactor core reload design:

   - Prepared and reviewed reactor core models for 2-, 3-, and 4-loop Westinghouse PWRs.
   - Performed safety analysis and prepared documentation.
   - Generated Nuclear Design Reports. These reports included startup and operating reactor physics predictions and other data used to support operation.
   - Performed study identifying probable cause of observed reactor core power tilt in a 3-loop Westinghouse PWR. Presented study to Westinghouse management and utility customer.

2) Criticality safety analysis for the storage and handling of nuclear materials

   - Implemented calculation methodology and process using KENO IV, XSDRN, NITAWL.
   - Worked on automation of NCS design calculations.
   - Trained engineers to perform NCS calculations.
   - Performed calculations to support safety analysis (fresh & spent fuel storage, consolidated spent fuel storage, burn-up credit for spent fuel storage, fresh fuel transport, and others)
   - Prepared reports.

1975-1979 United States Marine Corps, Sergeant, Honorable Discharge

Patents: Patent numbers 4,917,856 dated April 17, 1990 and 4,988,473 dated January 29, 1991, "Self-Latching Reactivity-Reducing Device for Use in On-Site Spent Fuel Assembly Storage."

Patent number 5,232,657 dated August 3, 1993, "Metal Hydride Flux Trap Neutron Absorber Arrangement for a Nuclear Fuel Storage Body."

Donald E. Mueller
Bldg 5700, MS 6170
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, TN 37831-6170

May 6, 2008
(865) 576-4121
MuellerDE@ornl.gov

Professional Affiliations:

American Nuclear Society (ANS), member
Serving on ANS Nuclear Criticality Safety Division Program Committee
Serving on ANSI/ANS-8.1, *Nuclear Criticality Safety in Operations with Fissionable Material Outside Reactors*, standard writing group.

Masters Thesis: "Background Considerations for a Silicon Detector Operated as a Part of an Alpha Particle Diagnostic System for the Tokomak Fusion Test Reactor," University of Illinois, 1984.

Publications:

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 U.S. Nuclear Regulatory Commission by Oak Ridge National Laboratory, Oak Ridge, Tenn., December 2007.

L. C. Leal, H. Derrien, M. E. Dunn, and **D. E. Mueller**, "Assessment of Fission Product Cross-Section Data for Burnup Credit Applications," ORNL/TM-2005/65, Oak Ridge National Laboratory, Oak Ridge, Tenn., December 2007.

G. Radulescu, **D. E. Mueller**, and J. C. Wagner, "Evaluation of Applicability of CRC Models for Burnup Credit Validation," *Trans. Am. Nucl. Soc*. **97**, 151-153 (2007).

E. D. Blakeman, D. E. Peplow, J. C. Wagner, B. D. Murphy, and **D. E. Mueller**, "PWR Facility Dose Modeling using MCNP5 and the CADIS/ADVANTG Variance-Reduction Methodology," ORNL/TM-2007/133, Oak Ridge National Laboratory, Oak Ridge, Tenn., September 2007.

C. V. Parks, J. C. Wagner, **D. E. Mueller**, and I. C. Gauld, "Full Burnup Credit in Transport and Storage Casks--Benefits and Implementation," *Radwaste Solutions* **14(2**), 32-41 (March/April 2007).

S. N. Williams and **D. E. Mueller**, "Survey of Operating Parameters for Use in Burnup Credit Calculations," *Trans. Am. Nucl. Soc*. **95**, 269-273 (2006).

D. E. Mueller and G. A. Harms, "Using the SCALE 5 TSUNAMI-3D Sequence in Critical Experiment Design," *Trans. Am. Nucl. Soc*. **93**, 263-266 (2005).

D. E. Mueller and B. T. Rearden, "Sensitivity Coefficient Generation for a Burnup Credit Cask Model using TSUNAMI-3D," presented at the 2005 NCSD Topical Meeting, Knoxville, TN, September 19-22, 2005.

J. C. Wagner and **D. E. Mueller**, "Updated Evaluation of Burnup Credit for Accommodating PWR Spent Nuclear Fuel to High-Capacity Cask Designs," presented at the 2005 NCSD Topical Meeting, Knoxville, TN, September 19-22, 2005.

D. E. Mueller and J. C. Wagner, "Application of Sensitivity/Uncertainty Methods to Burnup Credit Criticality Validation," presented at the IAEA Technical Meeting on Advances in Applications of Burnup Credit to Enhance Spent Fuel Transportation, Storage, Reprocessing and Disposition, London, U.K., August 29-September 2, 2005.

Donald E. Mueller
Bldg 5700, MS 6170
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, TN 37831-6170

May 6, 2008
(865) 576-4121
MuellerDE@ornl.gov

Publications (cont.):

J. C. Wagner and **D. E. Mueller**, "Assessment of Benefits for Extending Burnup Credit in Transporting PWR Spent Nuclear Fuel in the USA," presented at the IAEA Technical Meeting on Advances in Applications of Burnup Credit to Enhance Spent Fuel Transportation, Storage, Reprocessing and Disposition, London, U.K., August 29-September 2, 2005.

I. C. Gauld and **D. E. Mueller**, *Evaluation of Cross-Section Sensitivities in Computing Burnup Credit Fission Product Concentrations*, ORNL/TM-2005/48, Oak Ridge National Laboratory, Oak Ridge, Tenn., August 2005.

D. A. Reed, A. W. Krass, and **D. E. Mueller**, "Criticality Index Determination for Transport of a Non-DOT Package of $U(2.75)O_2$," Oak Ridge National Laboratory, May 2004.

D. A. Reed, **D. E. Mueller**, and R. G. Taylor, "Processing of Nuclear Ship Savannah Fuel," presented at 2004 ANS Annual meeting in Pittsburgh, June 2004.

D. E. Mueller, "Nuclear Criticality Safety at Oak Ridge National Laboratory," invited paper/presentation for the Eleventh Annual Energy Facilities Contractors Group (EFCOG) Safety Analysis Working Group (SAWG) Workshop, Milwaukee, WI, June 14-21, 2001.

D. E. Mueller, C. M. Hopper, and E. C. Crume, "MSRE Remediation or A Criticality Carol," presented at DOE NCTSP Workshop at Gaithersburg, MD, May 15, 1996.

D. E. Mueller and W. A. Boyd, "Qualification of KENO Calculations with ENDF/B-V Cross Sections," *ANS Transactions*, Vol. 56, 1988. Presented at the ANS Conference in San Diego in June 1988.

W. A. Boyd and **D. E. Mueller**, "Effects of Poison Panel Shrinkage and Gaps on Fuel Storage Rack Reactivity," *ANS Transactions*, Vol. 56, 1988. Presented at the ANS Conference in San Diego in June 1988.

J. E. Pritchett and **D. E. Mueller**, "Operational Experience with ZrB_2 Integral Fuel Burnable Absorbers," *ANS Transactions*, Vol. 55, 1987.

R. L. Simmons, N. D. Jones, J. E. Pritchett, **D. E. Mueller**, and F. D. Popa, "Integral Fuel Burnable Absorbers with ZrB_2 in Pressurized Water Reactors," *ANS Transactions*, Vol. 53, 1986.

G. Gerdin, **D. E. Mueller**, and B. W. Wehring, "Charge Neutralization by Foils to Study Alpha Edge Flux Produced in a Magnetic Fusion Reactor," *Fusion Technology*, Vol. 7, March 1985.

G. Gerdin, B. Wehring, T. Blue, **D. E. Mueller**, and D. Femia, "Charge Conversion Foil Approach to Observation of Alpha Orbit Losses," presented at the Alpha Particle Workshop, Oak Ridge National Laboratory, Knoxville, TN, February 22-23, 1984.

D. E. Mueller, G. Gerdin, B. W. Wehring, T. Emoto, and T. Blue, "A Passive Approach to Measurement of Alpha Particle Energies in TFTR," *Bull. Am. Phys. Soc.*, 28, 1071, October 1983.