

Donald E. Mueller  
MS 6070, Bldg 5700  
Oak Ridge National Laboratory  
P.O. Box 2008  
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September 27, 2004  
(865) 576-4121  
MuellerDE@ornl.gov

**Summary:** Nuclear Engineer (MS) with 20 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 Staff member of Criticality and Shielding Methods and Applications, Nuclear Science and Technology Division, Oak Ridge National Laboratory

1992-2004 Nuclear Criticality Safety (NCS) Specialist, NCS Staff, OSSD, Oak Ridge National Laboratory, Oak Ridge, TN.

Providing 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, 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 audit support at ORNL, Y12, and at Fernald.
- Provided support for and performed compliance surveys.
- Performed initial verification 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.

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.

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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 fuel storage, spent fuel storage, consolidated spent fuel storage, burn-up credit for spent fuel storage, 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.”

**Professional Affiliations:**

American Nuclear Society (ANS), member  
Serving on ANS Nuclear Criticality Safety Division Program Committee

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

**Publications:**

"Criticality Index Determination for Transport of a Non-DOT Package of  $U(2.75)O_2$ ," Oak Ridge National Laboratory, May 2004.

"Processing of Nuclear Ship Savannah Fuel," presented at 2004 ANS Annual meeting in Pittsburgh, June 2004.

"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, June 14-21, 2001, Milwaukee, WI.

"MSRE Remediation or A Criticality Carol," presented at DOE NCTSP Workshop at Gaithersburg, MD, May 15, 1996.

"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.

"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.

"Operational Experience with  $ZrB_2$  Integral Fuel Burnable Absorbers," *ANS Transactions*, Vol. 55, 1987.

"Integral Fuel Burnable Absorbers with  $ZrB_2$  in Pressurized Water Reactors," *ANS Transactions*, Vol. 53, 1986.

"Charge Neutralization by Foils to Study Alpha Edge Flux Produced in a Magnetic Fusion Reactor," *Fusion Technology*, Vol. 7, March 1985.

"A Passive Approach to Measurement of Alpha Particle Energies in TFTR," *Bull. Am. Phys. Soc.*, 28, 1071, October 1983.