

BRYAN L. BROADHEAD

P.O. Box 2008
Oak Ridge, TN 37831-6170
Phone: 202 586-6522
Mobile: 865 803-2463

SUMMARY

Nuclear Engineer (PhD) with experience in the use of computational methods for criticality safety, radiation shielding, radioactive source terms, and reactor analysis; particular expertise in sensitivity and uncertainty analysis methods, inverse studies for nuclear reactor material production and uranium enrichment cascade models. Extensive experience in spent fuel source terms for storage, transport, and disposal applications. Technical leadership demonstrated in the development and application of nuclear analysis software to numerous national security projects.

EDUCATION

University of Tennessee

Doctor of Philosophy in Nuclear Engineering, May 1983

Master of Science in Nuclear Engineering, May 1979

Mississippi State University

Bachelor of Science in Nuclear Engineering, May 1977

WORK EXPERIENCE

12/81-Pres. Oak Ridge National Laboratory

Distinguished Research & Development Staff

Nuclear Security Modeling Group, Reactor and Nuclear Systems Division

Supervisor: Dr. Vince Jodoin (10/2009 – Present)

Principal Investigator for research projects under NA-22, NA-24, DOE-IN sponsorship. Research covered many aspects of the Nuclear Fuel Cycle including enrichment, reactor operation, reprocessing, and safeguards. Nuclear forensics techniques applied to RDD events, safeguards, material production scenarios. Reactor models developed and proliferation scenarios explored for a large number of reactor types. Specific examples of projects (sponsors) include:

- Currently serving as Technical Advisor to the Enabling Capabilities Team at NA-221 since March 2013.
- Study of reactor effluents for determination of signatures for reactor operational information (NA-221 Plutonium Production Detection)
- Investigation of application of inverse gamma spectroscopy to material production and safeguards activities (NA-221 Simulation, Algorithms, and Modeling)
- Reactor Benchmarking tasks to support Material Production activities (NA-221 Simulation, Algorithms, and Modeling, PI)
- Plutonium production in selected reactor scenarios. This work generated material production scenarios in CANDU reactors, along with potential signatures that can be useful for safeguards, non-proliferation, and nuclear archaeology applications (NA-221, Plutonium Production Detection)
- Enrichment modeling (IAEA, NA-221 Uranium Production Detection and others)
- Reprocessing applications (collaboration with visiting scientists from ROK)
- Next Generation Safeguards Initiative (NGSI) activities include serving on Spent Nuclear Fuel (SNF) Non-Destructive Assay (NDA) review panel and work with LANL on Spent Nuclear Fuel libraries. (NA-24)
- Served on Materials Working Group for Nuclear Materials Information Project (DOE-IN)

Distinguished Research & Development Staff

Reactor Analysis Group, Nuclear Science and Technology Division

Supervisor: Dr. Jess Gehin (10/2006 – 10/2009)

A variety of projects were performed for the Department of Homeland Security (DHS) and various other sponsors. Examples of completed major projects include:

- Nuclear Forensics exercises for Cobalt, Cesium, and Strontium Sources (DHS, DTRA)
- Generation of reactor models for research reactors for inverse depletion studies (DHS)
- Development and testing of the INDEPTH (Inverse DEpletion Theory) code (NA-22, DHS)
- SCALE Shielding and Source Terms course instructor for Energy Northwest (Richland), Euratom (Luxemburg), and Idaho National Laboratory.

Senior Research & Development Staff

Criticality & Shielding Meth. and Appl. Group, Nuclear Science and Technology Div.

Supervisor: Dr. Cecil V. Parks (10/2003 – 10/2006)

Projects performed included applications in Criticality Safety and Radiation Shielding that were primarily sponsored by the Nuclear Regulatory Commission (NRC). Accomplishments and responsibilities included:

- Development and testing of the TSUNAMI Sensitivity and Uncertainty system for criticality safety applications, numerous training activities were also conducted upon release of the code system (NRC)
- The effective biasing of deep-penetration radiation shielding problems was developed and published for the NRC
- A comprehensive summary of radiation shielding analyses for radioactive materials transportation and storage packages was performed and published (NRC)

Senior Research & Development Staff

Nuclear Analysis Meth. and Appl. Group, Nuclear Science and Technology Div.

Supervisor: Dr. Cecil V. Parks (10/2001 – 10/2003)

Accomplishments and research areas included radiation transport studies for radioactive material transportation casks, teaching the Shielding and Source Term SCALE courses, and Burnup Credit studies for criticality safety applications.

Senior Research & Development Staff

Reactor & Fuel Cycle Group, Computational Physics and Engineering Div.

Supervisor: Dr. Cecil V. Parks (10/1994 – 10/2001)

Research areas include Burnup Credit for Boiling Water Reactor applications, development and testing of Cross Section Covariance codes, Radiation Shielding Benchmark development, development of the Nuclear Criticality SlideRule, co-authored the Radioactive Material Packaging Handbook, and developed Sensitivity/Uncertainty Analysis Methods for Criticality Safety.

Computing Consultant I/II

Computing Applications/Computing & Telecommunications Division

Supervisor: Dr. Cecil V. Parks (12/1981 – 10/1994)

Accomplishments include Criticality Accident Analysis System (CAAS) studies for several facilities, radiation shielding benchmark and validation studies for Electric Power Research Institute (EPRI), development of the SCALE point kernel code QADS, criticality safety studies for Three Mile Island accident cleanup activities, development of the LEPRICON system for EPRI to solve reactor pressure vessel damage problems, sensitivity/uncertainty studies for Hiroshima/Nagasaki dose reconstruction studies.

CITIZENSHIP / SECURITY CLEARANCE

US Citizen

12/81-Present

DOE Q-level security clearance; SCI; HCS

HONORS & ACTIVITIES

- UT-Battelle Awards; **Outstanding Paper Award**, several significant event awards.
- Reviewer for *Nuclear Technology*; *Nuclear Science & Engineering*
- Reviewer for ANS/ASTM Intl. Symposium on Reactor Dosimetry, 1996-present