

JOSEPH S. MILLER, P.E.

Nuclear Engineer · ASME Fellow · President and Principal Engineer, EDA, Inc.

PROFESSIONAL SUMMARY

Nuclear engineer with five decades in the nuclear industry across design, safety analysis, plant management and regulation. Directed a 65-engineer nuclear engineering department at an operating BWR, built its probabilistic risk assessment, and served as Technical Support Center Manager. As a consultant to the U.S. Nuclear Regulatory Commission, reviewed the Westinghouse AP1000 design certification, the first reactor design of its kind built in the United States, along with the EPR and US-APWR. Recognized thermal-hydraulics specialist, trainer and conference leader; ASME Fellow and recipient of the ICONE Award.

CORE EXPERTISE

- **Reactor design & safety analysis** – LOCA, transients, ATWS, containment
- **Thermal-hydraulics & fluid flow** – RELAP5, TRACE, GOTHIC, MAAP, NOTRUMP
- **Advanced reactors** – AP600, AP1000, EPR, US-APWR reviews
- **Probabilistic risk assessment** – Built River Bend's living PRA
- **NRC licensing** – 10 CFR 50.59, LERs, tech specs, FSAR/DCD, TERs
- **Nuclear security** – B.5.b Phase 2 & 3 assessments
- **Emergency response** – TSC Manager, EOPs, SAMGs, EDMGs
- **Nuclear fuel** – Reload design, core methods, procurement

PROFESSIONAL EXPERIENCE

EDA, Inc. (Engineering Design & Analysis), Vienna, VA **1996 – Present**

Founder, President and Principal Engineer

- NRC consultant on the AP1000: reviewed DCD Chapters 6 and 15, the Bellefonte and Lee combined license applications, and wrote Technical Evaluation Reports.
- Led the NRC technical evaluation of the AP1000 GSI-191 sump strainer and debris issue, including fuel testing, and briefed the Advisory Committee on Reactor Safeguards.
- Reviewed EPR DCD Chapters 4, 5 and 6 and US-APWR Chapters 6 and 15; developed TERs for the NRC staff.
- Supported the NRC B.5.b security evaluation of all U.S. operating plants: Phase 2 walkdowns of 3 BWRs and 3 PWRs, Phase 3 and final implementation reviews.
- Performed TRACE large-break LOCA analyses for the NRC break-size redefinition program (H. B. Robinson).
- Developed and taught the NRC course "Fundamentals of Nuclear Engineering" and AP1000 Chapter 15 training for Chinese regulators.
- Safety analysis for Westinghouse replacement steam generators (Byron, Braidwood); Oyster Creek heater-drain RELAP5 model; lead technical auditor of GE LOCA and stability methods; QA audits for BWROG and NUPIC.

Scientech, Inc., Rockville, MD **1994 – 1996**

Senior Technical Advisor and Manager, Utility Support Group

- Assessed the Westinghouse AP600 with RELAP5 against the OSU and SPES-2 test facilities; authored regulatory reports for the NRC.
- Lead technical consultant to NRC regional staff on on-site engineering inspections at PWRs and BWRs.

Gulf States Utilities / Entergy, River Bend Station (BWR/6), St. Francisville, LA **1985 – 1994**

Director, Nuclear Engineering (1991 – 1994)

- Led 65 engineers in four groups: Nuclear Fuels, NSSS Design & Performance, PRA and Site Engineering; set outage and work priorities.
- Owned the nuclear fuel budget, reload design and fuel procurement; developed the utility's core design, LOCA and transient methods.
- Prepared a fuel reload topical report that received an NRC Safety Evaluation Report; handled LERs, bulletins, tech specs and FSAR changes.

Supervisor and Senior Engineer, Site Engineering (1985 – 1990)

- Responsible for 10 safety-related systems; designed modifications to feedwater, HPCS and service water systems.

- Developed the station's living PRA, the ATWS boron-injection model and on-site analysis codes; served as Technical Support Center Manager and owner of the EOPs.

Black & Veatch Consulting Engineers, Overland Park, KS **1978 – 1985**
Engineer III, *Systems Engineering*

- Project engineer and manager for power plant safety valve testing and qualification; fire protection designs; supervised engineers on nuclear, coal and solid-waste plants.

Idaho National Engineering Laboratory, Idaho Falls, ID **1976 – 1978**
Senior Engineer, *Code Verification*

- Developed the first BWR LOCA model for RELAP4; hot-channel analysis with FRAP; regulatory support for a GE test facility.

NUS Corporation, Rockville, MD **1974 – 1976**
Engineer, *Safety Analysis*

- LOCA, containment and subcompartment analyses for PWRs; criticality and thermal-hydraulic analyses for 10 high-density fuel rack designs.

EDUCATION & LICENSES

- **M.S., Nuclear Engineering**, Kansas State University, 1974
- **B.S., Mechanical Engineering** (1973) and **B.S., Industrial Engineering** (1972), University of Arkansas
- Graduate study in nuclear technology, Idaho State University and American University
- Professional Engineer: Kansas (1978), Louisiana (1988), Maryland (2003) · CCNA · Microsoft Certified Professional
- FCC Amateur Extra Class radio license · American Red Cross instructor in First Aid, CPR and AED

AWARDS & HONORS

- Fellow, American Society of Mechanical Engineers (ASME) · ICONE Award, the conference's highest honor (2012)
- ASME Distinguished Service Award (2013) · Best Paper, ASME Power Conference (2007)
- U.S. Patent 5,327,930, Nuclear Reactor Locking Piston Drive System and Valve Assembly, with international patents
- Outstanding Employee, River Bend Station (1992) · Volunteer of the Year, Fairfax County, Virginia (2007)
- Albert Nelson Marquis Lifetime Achievement Award, Marquis Who's Who

PROFESSIONAL LEADERSHIP

- Technical Program Chair, ICONE17, Belgium (2009): 800+ attendees from 38 countries, 600+ papers; Track Chair ICONE14, ICONE16, ICONE18 (Xi'an, China)
- ASME Nuclear Engineering Division Executive Committee (from 2006) and Newsletter Editor (2006–2009); member, ASME Energy Committee
- Chair, ASME/NED Plant Operations & Maintenance Committee; Co-Chair, SSC Design & Analysis and Thermal-Hydraulics System Software committees
- Chair, American Nuclear Society Missouri/Kansas Section (1983, Best Section Award) and Louisiana Section (1990)

COMMUNITY SERVICE

- Honduras mission team leader for Grace Presbyterian Church; Mexico mission youth team leader; Help the Homeless coordinator
- Elder, Grace Presbyterian Church; Sunday school teacher for 14 years; tutor for elementary students
- Nurturing Parenting facilitator (15 years) and BeFriend a Child mentor, Fairfax County, Virginia
- Lieutenant Governor, Optimist International (2017–2019); President, Greater Vienna Optimist Club (2015); President, Zachary, Louisiana Lions Club (1992)

TECHNICAL TOOLS & PUBLICATIONS

Codes: RELAP4, RELAP5, TRACE, TRAC, SNAP, GOTHIC, CONTEMPT, CONTAIN, MAAP, NOTRUMP, COMPARE, MARCH, LOCVS, RETRAN. **Languages:** Fortran, C.

Selected publications (author and co-author of numerous papers in thermal-hydraulics and reactor safety):

- "A Linear Programming Fuel Management Model for the HTGR," *Annals of Nuclear Energy*, Vol. 2 (1975)
- "Alternatives for Reducing Thermal/Hydraulic Loads on the Safety/Relief Valve Discharge Piping," ANS Winter Meeting (1983)
- "Instrument Sensing Line Anomalies in BWRs," ANS Summer Meeting (1986)
- "A Boron Transport Simulation Using RETRAN Control System Models for ATWS Analysis," Fifth International RETRAN Meeting, EPRI-NP-5781-SR (1988)

ABOUT JOE MILLER

Engineer, teacher, volunteer and storyteller



Joe Miller spent his first 13 years on a dairy farm near Sacramento, California. Then his family moved to Arkansas, where he grew up working cattle, hauling hay and loading feed trucks around Dover. At Dover High School he played basketball and was the center fielder on the baseball team. He became the first person in his family to earn a college degree, two of them in engineering from the University of Arkansas, and then a Master of Science in Nuclear Engineering from Kansas State University in 1974.

His career followed the arc of American nuclear power. He started in safety analysis at NUS Corporation, built the first boiling-water-reactor accident model for RELAP4 at the Idaho National Engineering Laboratory, and designed power plant systems at Black & Veatch. In August 1985 he walked into River Bend Station in Louisiana on the day the plant received its permit to load fuel, and over the next nine years he rose to Director of Nuclear Engineering, leading 65 engineers.

In 1996 he founded EDA, Inc. Working with the Nuclear Regulatory Commission staff, he spent years on the safety review of the Westinghouse AP1000, asking one question he would not let go of: what if the water can't get to the core? In 2023, Vogtle Unit 3 in Georgia, the first AP1000 built in the United States, reached criticality. His work also took him to international conferences from Belgium to Xi'an, China, where he received the ICONE Award, and earned him the rank of ASME Fellow.

Joe has always believed engineering is a way to serve. For more than two decades he led church mission teams to Honduras, where every village brought a new engineering problem, a small budget and a willing crew. He has taught Sunday school, served as an elder, trained parents through Fairfax County's Nurturing Parenting program for 15 years, taught First Aid and CPR for the American Red Cross, and served as Lieutenant Governor of Optimist International.

Today Joe shares what he has learned. He is the author of the memoir The Evolution of a Nuclear Engineer and the creator of Critical Mass Book, Pass the Pool and The Nuclear Watch Dog, websites that teach everything from reactor physics to ham radio. A licensed Amateur Extra radio operator, he divides his time between Tennessee and the family ranch in Arkansas, and is happiest with his wife, Greta, and their nine grandchildren, his "Junior Engineers."

"Somewhere between Arkansas and Maryland I learned a rule I have never forgotten: never pull into any place you can't drive straight out of."

— Joe Miller, The Evolution of a Nuclear Engineer