

DAVIS A. REED

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OBJECTIVE

To work on challenging technical problems related to nuclear criticality and/or nuclear criticality safety (NCS).

CITIZENSHIP/CLEARANCE

U.S. citizen with active DOE Q-clearance.

EDUCATION

Bachelor of Science Degree in Nuclear Engineering, Mississippi State University (1979)
Graduate studies at the University of Tennessee (1979-1981)

EXPERIENCE

2008 - present: Research and Development Staff Member in the Radiation Transport and Criticality Group of the Nuclear Science and Technology Division (ORNL)

Primary responsibility: Support various ORNL and external customers in criticality and criticality safety methods development, applications, and reviews. Present external customers include Babcock and Wilcox Technical Services (Oak Ridge Y-12 Plant Nuclear Criticality Safety Committee), the Department of Energy's Criticality Safety Support Group (DOE CSSG), and the US Nuclear Regulatory Commission (support of new reactor licensing reviews, evaluate benchmarks to support fuel burn-up credit).

1995 - present: Instructor for the University of Tennessee

Primary responsibility: Function as an instructor for the annual Tennessee Industries Week short course in NCS and for the graduate-level course in NCS (NE-543). Reed's presentation topics address performance of NCS evaluations, validation of NCS computational methods, criticality accident alarms and technical bases, and emergency response for nuclear criticality accidents.

1994 - present: Instructor for H. L. Dodds Associates

Primary responsibility: Same as above as a University of Tennessee employee, except that the course presentations are to nuclear industry customers via a private consulting agreement with H. L. Dodds.

1999 – 2008: NCS Program Lead in the Nuclear and Radiological Protection Division (ORNL)

Primary responsibilities: Functioned as the technical leader for the NCS staff supporting fissionable material activities conducted by ORNL. Maintained the NCS programmatic and procedural infrastructure for ORNL, performed approvals of NCS staff work products, maintained controlled NCS software and workstations, functioned as the primary ORNL NCS trainer, guided work performed by other ORNL NCS staff, and provided comments and impact assessments for NCS-related DOE regulatory changes that potentially affected ORNL nuclear operations.

Work accomplishments as ORNL NCS Program Lead include revision of ORNL laboratory-level NCS command media (2002), development of an ORNL NCS Engineer Training and Qualification Program (2001, approved by DOE), development of an ORNL NCS Program Description (2004), and recruiting, hiring, and subsequent formal qualification of three NCS engineers (one each in 2003, 2004, and 2007).

Resume for Davis A. Reed
Page 2 of 5

EXPERIENCE - CONTINUED

As ORNL NCS Program Lead, Reed also supported outside (non-ORNL) customers:

- the Bechtel-Jacobs Plant Nuclear Criticality Safety Committee (member, 2001-2006),
- the BWXT-Y12 Nuclear Criticality Safety Committee (ad-hoc member for 2001, 2003, 2004, and 2005 annual NCS program reviews),
- a special investigating committee for BWXT-Y12 (Dollinger Filter Investigation, 2006),
- DOE Y-12 NNSA (Readiness Assessment for Phase II Disassembly operations, 2001), and
- two site visits/assessments for the DOE Criticality Safety Support Group (an assessment of the Los Alamos National Laboratory NCS program in 2005, and an assessment of NCS for the Hanford Bulk Vitrification Project, 2005).

1995 – 2008: NCS Engineer, ORNL

Primary responsibility: Criticality safety engineering support to maintain safe storage and chemical processing of ^{233}U , ^{235}U of various enrichments, and plutonium and transplutonium isotopes at ORNL.

Work accomplishments as a formally qualified ORNL NCS engineer include support for:

- retrieval, characterization, repackaging, and shipment of a wide variety of spent nuclear fuel,
- deinventory of inactive ORNL reactor facilities,
- disassembly and repackaging of legacy stainless-steel-clad low-enrichment reactor fuel (N. S. Savannah), disassembly and repackaging of legacy space reactor fuel (SNAP-TSF),
- packaging and shipment of bulk inventories of low-enrichment uranium oxide in non-DOT-compliant packages (including technical basis for exemption from U. S. DOT transport regulations),
- evaluation of the DOT 9975 package for $^{237}\text{NpO}_2$ handling, storage and transport,
- fuel element and transplutonium target management at the High Flux Isotope Reactor (HFIR),
- chemical processing of targets irradiated at HFIR or at other reactors, and fabrication of HFIR targets at the Radiochemical Engineering Development Center,
- evaluation of the storage configuration of ^{233}U at ORNL (primary analyst),
- legacy ^{233}U package retrieval and inspections, ^{232}Th extraction for medical trials, plus several one-time efforts for receipt and storage of ^{233}U from other DOE sites,
- remediation efforts for $^{233}\text{UF}_6$ gas migration at the Molten Salt Reactor Experiment Site (including design and evaluation of a $^{233}\text{UF}_6$ -to-oxide conversion facility, on-site transport of $^{233}\text{UF}_6$ traps, and storage and monitoring of stored traps),
- an NRC Pilot Program to examine the feasibility of ORNL nuclear activities being conducted according to NRC (rather than DOE) regulations, and
- support of various classified/sensitive activities for DOE.

Resume for Davis A. Reed

Page 3 of 5

EXPERIENCE - CONTINUED

1981 – 1995: NCS Engineer, Oak Ridge Y-12 Plant

Primary responsibility: Served as the primary NCS engineer for highly-enriched-uranium chemical recovery operations at the Y-12 Plant.

NCS work accomplishments included:

- support for NCS of day-to-day operations for two major enriched uranium chemical recovery complexes during a multi-year period of facility operation at maximum throughput,
- resolution of numerous off-normal conditions involving significant amounts of highly enriched uranium found in unanalyzed or unexpected conditions,
- support for several facility safety documentation upgrade efforts (e.g. "Safety Analysis Reports" and similar safety documents developed by the contractor for DOE approval),
- upgrade of legacy NCS evaluations and development of new NCS evaluations (for existing operations), and
- NCS design support for several multi-million-dollar chemical recovery area upgrades: Restoration of Uranium Processing Capabilities (Building 9206), Process Capabilities Restoration (Buildings 9215, 9212, and 9818), Enriched Uranium Recovery Improvements (Building 9212), Enriched Uranium Conversion (UF₆ to UF₄) Facility Modifications (Building 9212), and Air Emissions Control Project (Buildings 9206 and 9212).

1979 - 1981: Graduate Research Student for the University of Tennessee at ORNL

Primary responsibilities: Performed shielding calculations using a two-dimensional discrete ordinates code as part of ORNL support for a gas-cooled fast reactor design effort (1979-1980); performed data correlations for a light water reactor loss-of-coolant test loop (1980-1981).

1978 & 1979: Summer engineering intern at the Savannah River Plant (1978) and the Savannah River Laboratory (1979) for E. I. duPont Company

Primary responsibilities: Performed various engineering tasks in support of K-Reactor operations (1978) and in support of Nuclear Regulatory Commission projects related to light water reactor loss-of-coolant accident scenarios (1979).

TRAINING AND QUALIFICATION

Formal NCS-related training modules, activities, and qualifications include (but are not limited to):

- First participant in the Criticality Safety Specialist Intern Program (DOE Office of Nuclear Safety, September 1984 through April 1985); included a three-month assignment at ORNL to work with NCS specialists on various tasks, followed by a three-month assignment at LANL to perform critical experiments and subcritical measurements,
- Los Alamos Nuclear Criticality Safety Training Course,
- SCALE Shielding and Source Terms Training Course,
- SCALE KENO-VI Training Course,
- SCALE TRITON Training Course,
- SCALE TSUNAMI Training Course,
- Los Alamos MCNP Shielding Course,
- Los Alamos MCNP Advanced Topics Course,
- Lawrence Livermore National Laboratory Safety Analysis Reports for Packaging (SARP) Course,
- qualifications as an ORNL NCS Analyst, NCS Technical Reviewer, and NCS Approver, and
- qualification as the ORNL NCS Software Administrator.

Resume for Davis A. Reed
Page 4 of 5

TRAINING AND QUALIFICATION - CONTINUED

Y-12 and ORNL institutional training modules and qualifications include (but are not limited to):

- Kepner-Tregoe Problem-Solving and Decision-Making,
- Human Performance Improvement Fundamentals,
- Conducting Assessments Basics Training,
- Root Cause Analysis,
- Critique of Events Workshop,
- Instructor Skills Workshop,
- Unreviewed Safety Question Training, and
- Radiological Worker II Training.

PROFESSIONAL INVOLVEMENTS/OUTSIDE ACTIVITIES

Reed participates or has participated in these roles:

- Member (2005 - present) of the DOE Criticality Safety Support Group,
- Member (1987 - present) of the ANS-8 Standards Subcommittee for Fissionable Materials Outside Reactors,
- Chair (1989 - 2008) of American National Standards Institute Working Group ANSI/ANS-8.3, Criticality Accident Alarm System (the current revision of the Standard, ANSI/ANS-8.3-1997, was produced under Reed's chairmanship).
- Ad-hoc member (2001, 2003, 2004, and 2005) of the BWXT-Y-12 Company Nuclear Criticality Safety Committee (was appointed as a full member of the committee in June 2007),
- Member (2001 - 2006) of the Bechtel-Jacobs Company, LLC, Plant Nuclear Criticality Safety Committee,
- Member of the DOE Nuclear Data Advisory Group (2002 - present),
- Member of the DOE End-User's Group (1999 - 2008),
- Current member of the national and local chapters of the American Nuclear Society, and
- Secretary of the ANS Nuclear Criticality Safety Division (2005 - 2006).

Resume for Davis A. Reed

Page 5 of 5

PUBLICATIONS

Reed has functioned as the primary NCS analyst for approximately 400 original (i.e., not minor revisions of) NCS evaluations which are retained in records of the NCS organizations of either the Y-12 National Security Complex or the Oak Ridge National Laboratory. Reed has also authored several dozen internal technical NCS reports supporting Y-12 or ORNL fissionable material activities. Due to work priorities, organizational missions, and/or classification reasons, only a fraction of Reed's NCS work products have been formally published or cleared for external release. A comprehensive listing of Reed's more important NCS work products is available upon request.

Selected formal publications are listed below:

ORNL-5669, "Analysis of the Conceptual Shielding Design for the Upflow Gas-Cooled Fast Breeder Reactor," C. O. Slater, D. A. Reed, S. N. Cramer, M. B. Emmett, E. T. Tomlinson, Oak Ridge National Laboratory, 1981.

ORNL-5822, "Dispersed Flow Film Boiling in Rod Bundle Geometry-Steady State Heat Transfer Data and Correlation Comparisons," G. L. Yoder, D. G. Morris, C. B. Mullins, L. J. Ott, D. A. Reed, Oak Ridge National Laboratory, 1982

Y/DD-395, "Basic Nuclear Criticality Safety Guidelines for Enriched Uranium Recovery Areas at the Oak Ridge Y-12 Plant," D. A. Reed, Oak Ridge Y-12 Plant, 1987.

Y/DD-384, "Consequences of a Postulated, Moderated Nuclear Criticality Accident at the Oak Ridge Y-12 Plant," W. T. Mee, D. A. Reed, R. G. Taylor, Oak Ridge Y-12 Plant, 1988.

Y/DD-516, "A Criticality Safety Assessment of Uranium Compound Storage at the Oak Ridge Y-12 Plant," D. A. Reed, D. D. Butcher, and T. L. Krawczyk, Oak Ridge Y-12 Plant, 1991.

ANSI/ANS-8.3-1997, "Criticality Accident Alarm System," American Nuclear Society, 1997 (Reed was the Work Group Chair for the effort that resulted in the 1997 edition of the standard).

ORNL/TM-2003/200, "Nuclear Criticality Safety of the DOT 9975 Container for ²³⁷NpO₂ Storage, Handling, and Transport," D. A. Reed, S. Goluoglu, C. M. Hopper, R. M. Wham, Oak Ridge National Laboratory, 2003.