

# Allen G. Croff

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## CAREER SUMMARY

Employed from 1974 through 2003 by Oak Ridge National Laboratory (ORNL) in progressively more responsible technical, line management, and program management positions concerning waste management; nuclear fuel cycle, and nuclear materials research and development (R&D); strategic planning; and program development. Extensive external U.S. and international involvements on technical review, oversight, and integration committees. Presently an adjunct professor at Vanderbilt University in areas related to nuclear energy, nuclear fuel cycle analysis, and radioactive waste management, and a member of the Nuclear Waste Technical Review Board.

## PROFESSIONAL EXPERIENCE

- Presently an Adjunct Professor in the Vanderbilt Department of Civil and Environmental Engineering and a technical consultant to the Consortium for Risk Evaluation with Stakeholder Participation (CRESP) starting in 2008. Participating in Vanderbilt projects concerning nuclear fuel cycle analysis and evaluating risks at the Hanford site. In his role as a consultant to CRESP he has presented lectures and short courses ranging from an hour to 3 days to participants from CRESP, other organizations, and to Vanderbilt students, on reactors and the nuclear fuel cycle.
- Presently a member of the Nuclear Waste Technical Review Board appointed by the President.
- Creation of the ORIGEN2 computer code used world-wide to calculate the radioactive characteristics of nuclear materials for use in nuclear material and waste characterization, risk analyses, and nuclear fuel cycle analysis.
- Developing and evaluating comprehensive, risk-based waste classification systems, including changing the boundary defining transuranic waste from 10 to 100 nCi/g, and numerous technical reports and papers.
- Technical, economic, and systems analysis of current and advanced nuclear fuel cycles from uranium mining through waste disposal.
- Conceiving, analyzing, and reviewing actinide partitioning-transmutation (P-T) concepts beginning with the first comprehensive analysis of P-T from 1976 – 1980 through subsequent cycles of renewed interest in the concept up to the present.
- Associate director of the 300-person, \$60M+/yr ORNL Chemical Technology Division conducting nuclear R&D activities ranging from lab/desktop scale to demonstration scale.
- Strategic planning and program development for business centers at multiple levels of ORNL, including managing ORNL's diverse, multi-sponsor package of waste-related R&D programs funded at \$25M/yr and comprising over 60 distinct projects.

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## EDUCATION

- 1981 MBA from The University of Tennessee  
1974 Nuclear Engineer Degree from Massachusetts Institute of Technology  
1971 BS in Chemical Engineering from Michigan State University

## REPRESENTATIVE PUBLICATIONS (over 100 published)

### Books and Journal Articles

Allen G. Croff et al., "ORNL Experience and Perspectives Related to Processing of Thorium and  $^{233}\text{U}$  For Nuclear Fuel", *Nucl. Tech.* in press (May 2016).

Allen G. Croff and Steven L. Krahn, "Comparative Assessment of Thorium Fuel Cycle Radiotoxicity", *Nucl. Tech.* in press (May 2016).

A.G. Croff, "Nuclear Fuels and Isotopes," *Encyclopedia of Applied Physics*, Vol. 11, 479-512, ed. G.L. Trigg, VCH Publishers (1994).

A.G. Croff, "ORIGEN2: A Versatile Computer Code for Calculating the Nuclide Compositions and Characteristics of Nuclear Materials," *Nucl. Tech.* 62, 335 (September 1983).

J.O. Blomeke and A.G. Croff, "Nuclear Waste Partitioning and Transmutation," *Nucl. Tech.* 56, 361 (February 1982).

A.G. Croff, "Radioactive Waste Management," Chapter 6 in *The Light-Water Reactor Nuclear Fuel Cycle*, eds. R.G. Wymer and B.L. Vondra, UNISCIENCE Series, CRC Press (1981).

### Reports and Conference Papers

A. G. Croff and S. L. Krahn, "A Simple Improved Measure of Risk from a Geological Repository", Proceedings of the 15<sup>th</sup> International High-Level Radioactive Waste Conference, Charleston, SC, USA (April 12 - 16, 2015).

A. G. Croff and S. L. Krahn, "Comparative Assessment of Thorium Fuel Cycle Radiotoxicity", Transactions of the American Nuclear Society, November 9-13, 2014, Anaheim, California, USA, 390-392 (November 2014).

A. G. Croff, R. G. Wymer, L. L. Tavlarides, J. H. Flack, and H. G. Larson, *Background, Status, and Issues Related to the Regulation of Advanced Spent Nuclear Fuel Recycle Facilities*, NUREG-1909 (June 2008).

A. G. Croff, T. F. Lomenick, R. S. Lowrie, and S. H. Stow, *Evaluation of Five Sedimentary Rocks Other than Salt for Geologic Repository Purposes*, ORNL/TM-2003/256 (Nov 2003).

*Risk-Based Waste Classification of Radioactive and Hazardous Chemical Wastes*, Report No. 139 of the National Council on Radiation Protection and Measurements (December 2002).

H.C. Claiborne, A.G. Croff, J.C. Griess, F.J. Smith, *Repository Environmental Parameters and Models/Methodologies Relevant to Assessing the Performance of High-Level Waste Packages (Basalt, Tuff, and Salt)*, NUREG/CR-4134/R2 (October 1987).

A.G. Croff, J.O. Blomeke, and B.C. Finney, *Actinide Partitioning-Transmutation Program Final Report. I. Overall Assessment*, ORNL-5566 (June 1980).

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### SYNERGISTIC ACTIVITIES

*Nuclear Waste Technical Review Board.* Member of an 11-member board that is an independent federal agency to evaluate the technical and scientific validity of activities undertaken by the Secretary of Energy related to managing and disposing of spent nuclear fuel and high-level radioactive waste. The Board provides its independent expert advice to Congress and the Secretary of Energy.

*Blue Ribbon Commission on America's Nuclear Future.* Senior consultant to the Commission on technical issues related to reactors and the nuclear fuel cycle (2010-2012).

*Advisory Committee on Nuclear Waste and Materials.* Vice-chairman of the Advisory Committee on Nuclear Waste and Materials that provided independent technical advice to the commissioners of the U.S. Nuclear Regulatory Commission on waste disposal, the fuel cycle, and nuclear materials management (2004 to 2008).

*National Council on Radiation Protection and Management (NCRP):* Elected as one of ~70 U.S. council members for three six-year terms. The NCRP provides information to concerning radiation protection and radiation measurements, quantities and units, to the U.S. government agencies and the public (1998 to present).

*National Academy of Sciences.* Member of nine National Academy of Sciences' committees and co-author of as many NAS reports, most of which concerned the safety of and technology for DOE's program to clean up legacy wastes and subsurface contamination (1991 and 2009), as well as being a member of the National Academies' Nuclear and Radiation Studies Board (2004 to 2009).

*Chairman, NCRP Committee on Risk-Based Waste Classification.* The Committee provided the scientific foundation for a unified system of classifying wastes as a basis for addressing problems such as the inconsistencies between management of radioactive and chemical wastes and the need to determine the concentration of hazardous materials below which they can be neglected (1993 to 2003)

*Nuclear Energy Research Advisory Committee (NERAC):* Appointed by the Secretary of Energy to three successive two-year terms on an independent advisory committee to DOE's Office of Nuclear Energy (1998 to 2005).

*DOE Basic Energy Science's Advisory Committee:* Member and part-time chair of a committee that prepared the portions of a report entitled "Basic Research Needs to Assure A Secure Energy Future" concerning fission energy (2002).

*Nuclear Development Committee of the OECD Nuclear Energy Agency (NEA):* Elected chairman of a standing international committee of the OECD Nuclear Energy Agency the mandate of which includes the breadth of nuclear technology. Function of the Committee is to initiate and manage technical studies related to nuclear energy and publish the results in internationally recognized consensus reports (1992 to 2002).