

DOCKETED
USNRC

Attachment 4

Dr. J. Kevin McCoy

August 9, 2004 (11:45AM)

**Advisory Engineer - Materials
Framatome ANP, Inc.**

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

General Background

Dr. McCoy, a veteran scientist/engineer, has more than 20 years' experience, largely in the nuclear industry. He has proposed, planned, and executed research projects for the Nuclear Regulatory Commission (NRC), the Air Force Office of Scientific Research (AFOSR), the National Science Foundation (NSF), and the Electric Power Research Institute (EPRI). Dr. McCoy's research included developing models for waste glass degradation, identifying a new mechanism for densification of ceramics, vectorizing computer codes to run 500 times faster, and studying boundaries between quasi-periodicity and chaos as it applies to hydrogen embrittlement. In his research, Dr. McCoy developed methods for calculating the positions of atoms at a crack tip. He even found a method for calculating the energy barrier that must be surmounted to break one atomic bond.

Dr. McCoy worked on the Yucca Mountain Project (YMP) for nearly eight years, providing leadership and technical expertise on materials selection and nuclear waste behavior. He coordinated the efforts of Framatome ANP, Inc. and Lawrence Livermore National Laboratory to identify material properties and make material selection for the waste packages slated for use in the proposed geologic repository. Also, Dr. McCoy led the revision of a comprehensive report on nuclear waste behavior. This report summarizes \$25 million worth of research and is one of nine major documents used to support the site recommendation for the nation's first high-level radioactive waste repository.

His recent work has focused on the behavior of commercial nuclear fuel. In the past three years he has written or revised topical reports on dry fuel storage and the performance of a mixed oxide fuel assembly. He has also written several reports on poolside postirradiation examinations of irradiated fuel.

Education

- Ph.D., Materials Engineering, Purdue University
- M.S., Metallurgical Engineering, Purdue University
- B.S. (with Highest Distinction), Metallurgical Engineering, Purdue University

Qualifications/Certifications

- Good conversational and written French
- Listed in Who's Who in Science and Engineering
- Member, American Nuclear Society

Publications

- Civilian Radioactive Waste Management System Management & Operating Contractor, *Waste Form Degradation Process Model Report*, TDR-WIS-MD-000001 REV 00 ICN 01, July 2000.

Vertical stamp area containing text: SEARCHED, INDEXED, SERIALIZED, FILED, AUG 11 2004, FBI - MEMPHIS

NUCLEAR REGULATORY COMMISSION

Docket No. 50-413/414-OLA Official Exh. No. 50^{SHL}
In the matter of Duke Catawba
Staff WRS IDENTIFIED 7/14/04
Applicant ✓ RECEIVED 7/14/04
Intervenor _____ REJECTED _____
Cont'g Off'r _____
Contractor _____ DATE _____
Other _____ Witness _____
Reporter Brian Hillen

Representative of more than 30 peer-reviewed journal articles authored or co-authored are:

- D. Stahl, J. K. McCoy, and R. D. McCright, "Impact of Thermal Loading on Waste Package Material Performance", in *Scientific Basis for Nuclear Waste Management XVIII*, 671-678, ed. T. Murakami and R. C. Ewing, Materials Research Society, Pittsburgh (1995).
- J. K. McCoy, D. Stahl, and T. A. Buscheck, "A Corrosion Model for Waste Package Corrosion-Allowance Materials", in *Proceedings of the Sixth Annual International Conference on High Level Radioactive Waste Management*, 565-567, American Nuclear Society, La Grange Park, Illinois, and American Society of Civil Engineers, New York (1995).
- J. K. McCoy, "Fuel and Cladding Oxidation Under Expected Repository Conditions", in *Proceedings of the Seventh Annual International Conference on High Level Radioactive Waste Management*, 396-397, American Nuclear Society, La Grange Park, Illinois, and American Society of Civil Engineers, New York (1996).

Publications - continued

- J. K. McCoy, "Mechanical Failure of Commercial Spent Nuclear Fuel Cladding", in *Proceedings of the Sixth International Conference on Nuclear Engineering*, 632-633, American Society of Mechanical Engineers, New York (1998).
- J. A. Blink, T. W. Doering, J. K. McCoy, R. W. Andrews, J. H. Lee, D. Sevougian, V. Vallikat, D. G. McKenzie, and J. N. Bailey, "Factors Affecting Performance of Engineered Barriers", in *Proceedings of the Eighth Annual International Conference on High-Level Radioactive Waste Management*, 290-292, American Nuclear Society, La Grange Park, Illinois (1998).

Applicable Work Experience

Advisory Engineer II, Framatome ANP, 1993 – Present

- Revised topical report on performance of a mixed oxide fuel assembly. Report compares materials and performance of mixed oxide and low-enriched uranium fuels
- Wrote topical report on behavior of spent nuclear fuel in dry storage. Provided justification for increasing the allowable burnup limit
- Prepared six reports on poolside postirradiation examinations of nuclear fuel assemblies
- Predicted behavior of high-level radioactive wastes and support selection of waste container material

- Led revision of a comprehensive report on nuclear waste behavior. Report summarizes \$25 million worth of research and is one of nine major documents that supported site recommendation for the nation's first high-level nuclear waste repository
- Critically reviewed models for creep rupture of spent fuel cladding. Determined that previous models did not adequately account for cladding texture. Showed that inclusion of the effects of texture increases predicted creep life by a factor of six
- Developed novel mathematical approach for describing degradation of spent nuclear fuel. The new approach is based on a deep insight into the similarities in the degradation behavior of fuel rods that start to degrade at different times. Lengthy performance calculations are now performed more than ten times faster
- Developed computer model to simulate bending and breaking of fuel rods during earthquakes. Proved that earthquakes strong enough to break fuel rods occur only once in a million years and would have very little effect on repository performance.

Principal Research Scientist, Battelle, Metals and Ceramics Department, Columbus, Ohio (1981-1992)

- Proposed, planned, and executed research projects. Analyzed physical processes in materials, mostly with C code. Provided own research support. Served as system administrator for departmental UNIX computer system with twenty users
- Developed methods for calculating the positions of atoms at a crack tip. Found method to calculate the energy barrier that must be surmounted to break one atomic bond. Knowing the height of the barrier is critical for calculating crack growth rates. This breakthrough came after several years of unsuccessful efforts by other scientists
- Developed technique for instrumenting hot isostatic pressing. Instrumentation provides a continuous record of material behavior and increases the amount of data obtained from costly experiments by three to five times
- Managed personal computer resources for department with fifty users. Planned hardware acquisitions and allocated resources.