

THE PROPOSED YUCCA MOUNTAIN REPOSITORY FROM A CORROSION PERSPECTIVE

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Joe H. Payer
Case Western Reserve University
Cleveland, Ohio

Corrosion is a primary determinant of waste package performance at the proposed Yucca Mountain Repository and will control the delay time for radionuclide transport from the waste package. Corrosion is the most probable and most likely degradation process that will determine when packages will be penetrated and the shape, size, and distribution of those penetrations. The general issues in corrosion science, materials science and electrochemistry are well defined, and the knowledge base is substantial for understanding corrosion processes.

In this paper, the Yucca Mountain Repository is viewed from a corrosion perspective. A major component of the long-term strategy for safe disposal of nuclear waste at the Yucca Mountain Repository is first to completely isolate the radionuclides in the waste packages for long times and to greatly retard the egress and transport of radionuclides from penetrated packages. Therefore, long-lived waste packages are important. The corrosion resistance of the waste package outer canister is reviewed, and a framework for the analysis of localized corrosion processes is presented. An overview is presented of the Materials Performance targeted thrust of the U.S. Department of Energy/Office of Civilian Radioactive Waste Management's Office of Science and Technology and International. The thrust program strives for increased scientific understanding, enhanced process models and advanced technologies for corrosion control.