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The Proposed Yucca Mountain Repository from a Corrosion Perspective

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The proposed Yucca Mountain Repository presents a familiar materials performance application that is regularly encountered in energy, transportation and other industries. The widely accepted approach to dealing with materials performance is to identify the performance requirements, to determine the operating conditions to which materials will be exposed and to select materials of construction that perform well in those conditions. A special feature of the proposed Repository is the extremely long time frame of interest, i.e. 10,000's of years and longer. Thus, the *time evolution of the environment* in contact with waste package surfaces and the *time evolution of corrosion damage* that may result are of primary interest in the determination of expected performance.

Researchers at Case are part of a Department of Energy Corrosion and Materials Performance Cooperative. This team of leading scientists/engineers from major universities and national laboratories is working together to further enhance the understanding of the role of engineered barriers in waste isolation. The team is organized to address important topics:

- Long-term behavior of protective, passive films
- Composition and properties of moisture in contact with metal surfaces
- Rate of penetration and extent of corrosion damage over extremely long times

The work will also explore technical enhancements and seek to offer improvements in materials costs and reliability.