Performance of Waste Containment Systems for Long-Lived Waste Forms: Lessons Learned from the Field

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Engineers design containment facilities to store long-lived waste forms that can be a threat to the environment for 1000s of years (e.g., low level radioactive waste). These designs are based on current knowledge and principles, but the facilities are required to have a service life of a millennium of more, far beyond any modern engineering experience. Over the last decade, we have had the opportunity to exhume and inspect containment facilities for long-lived waste forms that have been in-service for up to three decades, providing a glimpse of the degradation mechanisms and the condition that may exist in the future. These observations, along with lessons learned from studying natural analogs in the environs of containment facilities, have reframed and refined our perspective on containment system design for very long service lives that go far beyond our experience. Observations that we have made, and the lessons learned, will be shared in this presentation. Recommendations will be provided that are important to current students and seasoned professionals.

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