

Projecting risk into the future: Sinking of the Titanic and failure of a geologic repository

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The “unsinkable” RMS Titanic sank on April 14, 1912, in the North Atlantic Ocean on its maiden voyage from Southampton, UK, to New York City. There was no single cause for the loss of the Titanic, rather the improbable combination of errors in human design and judgment, combined with unforeseeable circumstance, lead to the loss of over 1,500 lives. The failure appears to have occurred over a range of spatial and temporal scales – from the atomic-scale processes of the embrittlement of iron rivets to global-scale fluctuations in climate and ocean currents. Regardless of the specific combination of causes, this failure in design and practice led to impressive improvements in both. Disaster and tragedy are harsh teachers, but critical to improvement and progress.

The important question for the nuclear waste management community is: *How do we learn and improve our waste management strategies in the absence of the benefit of failure?* A geologic repository “operates” over a very distant time fame, and today’s scientists and engineers will never have the benefit of studying the failed system. In place of failure followed by improvements, we only can offer a general consensus on disposal strategies and their effectiveness. However, it may well be that consensus leads to complacency and compromise, both of which may be harbingers of a failed repository. I will discuss these issues in the context of recent accidents and the release of radioactivity at the Waste Isolation Pilot Plant, a geologic repository for transuranic waste in southeastern New Mexico.