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Chemical and Physical Environment on the Surface of SNF Interim Storage Canisters

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One major concern with the long-term interim storage of spent nuclear fuel is stress corrosion cracking (SCC) of the stainless steel storage canisters. SCC corrosion requires an aggressive chemical environment, which could form by deliquescence of chloride-rich salt aerosols deposited on the canister surface from air flowing through the passively-ventilated canister overpacks. Here, we discuss models for the chemical and physical environment on storage canister surfaces; how the environment may vary with canister storage site, and with location on the canister surface; and how it evolves as the canister heat load decreases and the canisters cool. Compositional data for salts and dust collected from the surface of in-service storage canisters at three sites is also presented. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. (150 words)