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Impact of Atmospherically Deposited Solid Contaminants on Materials of Interest for the Interim and Long Term Storage of High Level Nuclear Waste

D.G. Enos

For both the interim and long term storage of high level nuclear waste, the storage casks/containers will be exposed to conditions under which considerable dust and/or atmospheric aerosols may be deposited on the surface. These dust layers may contain a sizeable portion of water soluble salts, particularly in marine environments where many interim storage systems are located. These soluble salts will deliquesce if sufficient moisture is present, resulting in the formation of a potentially corrosive brine on the material surface. While this is not a concern for highly corrosion resistant materials such as Hastelloy C22 (which was pursued for long term geologic storage), it could be an issue for the less corrosion resistant stainless steels and carbon steels used for interim storage applications. Experimental results have illustrated that some stainless steels can and will undergo localized corrosion in elevated temperature conditions where a chloride rich brine has formed on the surface. In this presentation, the results of this test program, as well as efforts to address the potential for corrosion stifling under conditions where a limited quantity of reactant is present will be discussed.

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