UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
2300 Clarendon Boulevard, Suite 1300
Arlington, VA 22201

July 10, 2007

Mr. Edward F. Sproat III
Director, Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Sproat:

The U.S. Nuclear Waste Technical Review Board held a public workshop on localized corrosion of Alloy 22 on September 25-26, 2006, in Las Vegas, Nevada. Following the workshop, the Board conveyed its comments and conclusions on screening out deliquescence-based localized corrosion in a letter to you dated January 12, 2007. The Board stated in that letter that "demonstrating an adequate technical basis for screening out deliquescence-based localized corrosion during the thermal pulse requires (a) determining the nitrate-to-chloride ratios that are inhibitive for the entire range of temperatures that deliquescent brines may occur on waste package surfaces and (b) confirming the hypothesis that the preferential migration of nitrate ions into the crevices is sufficient to maintain nitrate-to-chloride ratios that are inhibitive." The following extends and supplements the Board's January 2007 letter.

In addition to (a) and (b) above, the Board believes that the technical basis for screening out deliquescence-induced localized corrosion would be strengthened by showing that inhibitive nitrate-to-chloride ratios would persist during the thermal pulse under expected repository conditions. The importance of establishing the continued presence of inhibitive nitrate-to-chloride ratios was reinforced by the results of recent analyses of dust collected from the cool-down phase of the drift-scale thermal test, which show that nitrate may have been depleted under the testing conditions. The Board believes that factors and processes that contribute to a decline in nitrates under potential repository conditions should be analyzed and understood.

An example of such factors is the composition of dusts that will be present in the repository. Most of the nitrate in deliquescent brines comes from inorganic salts contained in dust that deposits on waste package surfaces, primarily during the ventilation period. However, the dust also contains organic materials and carbon that have not been included in DOE's representation of dust likely to be present in repository tunnels. DOE should evaluate the potential effects of the depletion of nitrate that would occur from a reaction with organic material under repository conditions during the thermal pulse.

As discussed in the Board's January letter, screening out localized corrosion requires determining the nitrate-to-chloride ratios that would exist in brines on waste package surfaces under varying repository conditions during the thermal pulse. Providing convincing evidence that inhibitive nitrate-to-chloride ratios will persist under repository conditions could strengthen the technical basis for screening out localized corrosion. Therefore, DOE should analyze the effects of the full range of factors that would affect such ratios (e.g., organics in dust, acid-gas devolatilization, radiolysis).

Sincerely,

{Signed by}

B. John Garrick
Chairman