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6220 Culebra Road • San Antonio, Texas, U.S.A. 78228-5166  
(210) 522-5160 • Fax (210) 522-5155

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Contract No. NRC-02-97-009

Account No. 20.01402.571

U.S. Nuclear Regulatory Commission  
ATTN: Mrs. Deborah A. DeMarco  
Two White Flint North  
11545 Rockville Pike  
Mail Stop T8 A23  
Washington, DC 20555

Subject: Programmatic review of an abstract

Dear Mrs. DeMarco:

The enclosed abstract is being submitted for programmatic review. The abstract will be submitted for presentation at the 25<sup>th</sup> International Symposium on the Scientific Basis for Nuclear Waste Management of the MRS 2001 Fall Meeting to be held November 26-30, 2001 in Boston, Massachusetts. The title of this abstract is:

"Localized Corrosion Susceptibility of Alloy 22 as a Waste Package Container Material" by D.S. Dunn, C.S. Brossia, L. Yang, Y.-M. Pan, N. Sridhar, and G.A. Cragnolino.

This paper is a result of the activities conducted in FY2000 and FY2001 under task 01402.571 to resolve the issue related to the effects of engineering materials on the chemistry of water.

Sincerely,



Budhi Sagar  
Technical Director

Enclosure

BS:GC:jg

cc:	J. Linehan	J. Greeves	T. Ahn	J. Thomas	CNWRA EMs	L. Yang
	D. DeMarco	J. Piccone	C. Greene	T. Essig	G. Cragnolino	Y.-M. Pan
	B. Meehan	K. Stablein	T. Bloomer	W. Patrick	D. Dunn	P. Maldonado
	E. Whitt	B. Leslie	J. Andersen	CNWRA Dirs.	S. Brossia	T. Nagy (contracts)



Washington Office • Twinbrook Metro Plaza #210  
12300 Twinbrook Parkway • Rockville, Maryland 20852-1606

MRS 2001 Fall Meeting  
The 25<sup>th</sup> International Symposium on the Scientific Basis for Nuclear Waste Management  
November 26-30, 2001  
Boston, Massachusetts

## LOCALIZED CORROSION SUSCEPTIBILITY OF ALLOY 22 AS A WASTE PACKAGE CONTAINER MATERIAL

D.S. Dunn, C.S. Brossia, L. Yang, Y.-M. Pan, N. Sridhar, and G.A. Cragnolino.  
Center for Nuclear Waste Regulatory Analyses  
Southwest Research Institute  
6220 Culebra Road, San Antonio, TX 78238-5166

### Abstract

The susceptibility of Alloy 22 to localized corrosion is important in the evaluation of the waste package outer barrier and overall performance of the proposed repository at Yucca Mountain, NV. Factors significant to localized corrosion susceptibility include the chemical composition of the waste package environment, temperature, and fabrication processes. Environmental chemical composition and temperature effects were examined by measuring the repassivation potential for crevice corrosion in chloride containing solutions at temperatures in the range of 80 to 150°C. The effects of potentially inhibiting anionic species, such as nitrate, and potentially aggressive cationic species, such as lead, were also determined in laboratory tests. In addition to the as-received material, tests were conducted on both welded and thermally aged material to evaluate the effects of waste package fabrication processes. The Alloy 22 localized corrosion susceptibility decreased when temperature and chloride concentration were increased. Welding and thermal aging also decreased the localized corrosion resistance of the alloy. Results of both short term and long term tests indicate that localized corrosion can be initiated on Alloy 22 in chloride containing environments at temperatures less than those at which a liquid film can be formed on the container surface by the presence of deliquescent salts.

Disclaimer: This paper was prepared to document work performed for the Nuclear Regulatory Commission under Contract No. NRC-02-97-009. This work is an independent product of the Center for Nuclear Waste Regulatory Analyses and does not necessarily reflect the views or regulatory position of the Nuclear Regulatory Commission.