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MEMORANDUM

To: Drs. Anthony Hechanova and Gary Cerfice, HRC
From: Drs. Ajit Roy and Brendan O’Toole, MEG
Date: March 24, 2002

Subject: AAA Task-10 Quarterly (12/1, 2001 –02/28, 2002) Report

Introduction

The objective of this task is to evaluate the elevated temperature tensile properties of Alloy EP-823, a leading target material for accelerator-driven waste transmutation applications. The test material will be thermally treated prior to evaluation of its tensile properties at temperatures relevant to the transmutation applications. The deformation characteristics of tensile specimens, upon completion of testing, will be evaluated by surface analytical techniques including scanning electron microscopy (SEM) and transmission electron microscopy (TEM). The overall results are expected to provide a mechanistic understanding of high-temperature deformation behavior of Alloy EP-823 as a function of heat treatment.

Personnel

The current project participants are listed below.

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Collaborator (DOE): Dr. Stuart A. Maloy, Los Alamos National Laboratory, New Mexico
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Highlights of Accomplishment

• Three experimental heats of EP-823 martensitic stainless steel have been melted, and processed into round bars at the Timken Company, Canton, Ohio. One heat of this material has been heat
treated (quenched and tempered) to produce fully tempered martensitic microstructure, typical of a martensitic stainless steel. Hardness measurements have also been performed (≈30 R_c). Efforts are well underway to machine tensile specimens from these heat-treated bars.

- The high-temperature and inert gas chamber with extension rod assembly and system software, that were ordered during this past quarter to perform high-temperature mechanical testing of Alloy EP-823 using an existing MTS machine, is expected to arrive at UNLV during April/May 2002 timeframe. Meanwhile, ambient-temperature tensile data will be generated as the machined test specimens of Alloy EP-823 become available.

- Round wedges for specimen grips in the MTS equipment have been ordered to facilitate the tensile testing using the inert gas chamber.

Problems

Since the MTS equipment will stay in its current location (#B150), no delays or problems are anticipated.

Status of Funds

Expenditures incurred during this quarter are within the target amount allocated.

Plans for Next Quarter

- Machine tensile test specimens from the heat-treated bars.
- Prepare test matrices.
- Perform additional thermal treatments.
- Initiate ambient-temperature tensile testing.
- Install the new inert gas chamber/other accessories to conduct elevated-temperature testing.