HLWYM HEmails

From: Yi-Ming Pan
Sent: Monday, June 23, 2008 6:02 PM
To: Keith Axler
Cc: Asadul Chowdhury; LSNReviews
Subject: FW: Photos from waste package prototype annealing operation at Joseph Oat

Keith: per our discussion today, I forward you the following email that may contain documentary material. -Yiming

-----Original Message-----
From: Yiming Pan [mailto:ypan@cnwra.swri.edu]
Sent: Tuesday, August 01, 2006 12:30 PM
To: Tech_Group
Subject: Photos from waste package prototype annealing operation at Joseph Oat

All,

I and Rosemary Reeves (NRC) observed the waste package prototype annealing operation at Joseph Oat last week. This heat treatment process is a critical fabrication step intended to remove any residual stresses from fabrication, introduce compressive surface stresses to delay the onset of stress corrosion cracking, and minimize the metallurgical instability in the welds (i.e., formation of precipitates). The outer barrier prototype was heated to 2,050 F in a furnace and held for one hour. The prototype was then pulled out of the furnace and quenched in a water tank. The fabrication specification requires that transfer time of the prototype from the furnace to the water quenching tank is a maximum of 2 minutes, and the quenching process to bring the temperature down to 700 F is less than 8 minutes. Seven thermocouples were installed to monitor the prototype surface temperatures.

In my view, the annealing operation was a great success. The transfer time was about 1 minute, and the surface temperature of the prototype decreased below 700 F within about 4 minutes. However, we observed that one thermocouple installed at the center of the lid inside the prototype measured a temperature higher than 700 F after cooling for 9 minutes, possibly due to a hot air gap at the top of the prototype. The observed cooling behavior is not anticipated to affect the formation of compressive stresses on the outside, but may lead to nucleation and growth of precipitates. BSC staff indicated that the required cooling specification could be met using larger snorkels or through other cooling methods. We did not observe the post-annealed prototype because of traveling schedule. According to Joseph Oat, there is no visible distortion after inspection. Dimensional measurements and extensive characterization are planned for the prototype per BSC staff.

I have placed a number of photos from the annealing operation under S:\YPan\Waste Package Annealing to share with the staff. Photos wp1 through wp5 were taken on 7/25/06 during preparation and the rest were from the annealing operation on the 26th. A formal presentation may be given in a future Yucca Mountain Team Meeting. If you have any questions regarding this annealing operation, please feel free to call me.

Yiming

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From: Yi-Ming Pan

Created By: ypan@cnwra.swri.edu

Recipients:
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