



Department of the Interior
US Geological Survey
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July 27, 2011

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Reference: U.S. Geological Survey TRIGA Reactor (GSTR), Docket 50-274, License R-113
Request for Additional Information (RAI) dated September 29, 2010

Subject: Response to Question 2 of the Referenced RAI

Mr. Wertz:

Question 2: NUREG-1537, Part 1 Section 4.2.1, "Reactor Fuel", requests a description of the reactor fuel that includes the material properties. The GSTR SAR Table 4.1 describes the GSTR fuel inventory as having 8.5 weight percent (wt%) and 12 wt% SS clad fuel and 8 wt% Aluminum clad fuel. However, GSTR SAR subsection 4.2.1.7 only describes the volumetric-specific heat for the 8.5 wt% and 20 wt% fuel. Please provide the volumetric heat capacity for 8 wt% and 12 wt% fuel.

Response: According to NUREG-1282, "The performance of uranium-zirconium hydride fuel is substantially independent of uranium content up to 45 wt% uranium." The volumetric heat capacity is described by $CP = 2.04 + 4.17 * 10^3 (T) \text{ (W-sec/cm}^3\text{-}^\circ\text{C)}$.

Therefore, the volumetric heat capacities for the 8 wt% and 12 wt% fuels are the same as for the 8.5 wt% fuel.

REFERENCE:

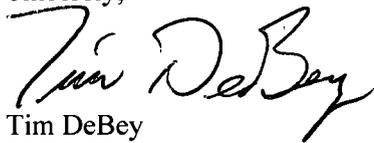
M. T. Simnad, "The U-ZrHx Alloy: Its Properties and Use in TRIGA Fuel," Nuclear Engineering and Design 64 (November 1980), 403-422.
NUREG-1282, op. cit.

Our need for outside assistance to answer the detailed, technical RAI questions is being addressed by a DOE contract with the Colorado School of Mines (CSM). The work under this contract is in progress with the development of a detailed MCNP core model and RELAP thermal hydraulics model. An on-site meeting was held on July 19-20 with two representatives from the Oregon State University (OSU) TRIGA facility to discuss proper modeling techniques and methodology for addressing RAI questions.

A020
MRR

This meeting was very helpful and productive. The OSU representatives told us that they would be available to answer future questions by phone or email.

Sincerely,

A handwritten signature in black ink that reads "Tim DeBey". The signature is written in a cursive style with a large, stylized "T" and "B".

Tim DeBey
USGS Reactor Supervisor

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 7/27/11

Copy to:

Betty Adrian, Reactor Administrator, MS 975