

**From:** "Potts, Gerald A. (GNF)" <Gerald.Potts@gnf.com>  
**To:** "Ralph Meyer" <ROM@nrc.gov> -RES  
**Date:** 2/10/06 4:29PM  
**Subject:** RE: Alternate Alloy

Ralph,

Thank you. Sounds like a plan.

GAP

-----Original Message-----

**From:** Ralph Meyer [mailto:ROM@nrc.gov]  
**Sent:** Friday, February 10, 2006 3:18 PM  
**To:** Potts, Gerald A. (GNF)  
**Cc:** billone@anl.gov  
**Subject:** RE: Alternate Alloy

Jerry,

The following is my own opinion and does not constitute any decision by the NRC.

Technically speaking, after we complete our work on Zircaloy-2, Zircaloy-4, M5, and ZIRLO, I don't think we will need to have further testing of irradiated cladding for LOCA analysis, provided we are dealing with Zr with Sn and Nb as major alloying elements. I don't even think that other alloying elements would upset our picture. I can't imagine anything worse than Nb for LOCA embrittlement (aliovalent and very high affinity for oxygen). I believe we will have such a good understanding that testing of unirradiated cladding with and without hydrogen will be sufficient. But we need to complete our current work with this variety of irradiated materials to confirm the understanding.

Practically speaking, I don't think we will be able to do any further LOCA testing of irradiated fuel once we finish with Zircaloy, M5, and ZIRLO at ANL. We're going to be very lucky to get that done before they kick us out of the hot cell. Further, unless some new phenomenological crisis arises, I don't think NRC or anyone else will put up enough money to do such tests. Maintaining funding for this work has been unbelievably difficult.

I appreciate your quiet cooperation and encourage you to keep working with Mike and me.

Ralph

---

>>> "Potts, Gerald A. (GNF)" <Gerald.Potts@gnf.com> 02/10/06 9:12 AM >>>  
Ralph,

No. Same elements as Zr-2, only a higher concentration for some.

GAP

-----Original Message-----

**From:** Ralph Meyer [mailto:ROM@nrc.gov]  
**Sent:** Friday, February 10, 2006 9:05 AM  
**To:** Potts, Gerald A. (GNF)  
**Subject:** Re: Alternate Alloy

A-42

Jerry,

Does the alternate cladding contain niobium?

Ralph

---

>>> "Potts, Gerald A. (GNF)" <Gerald.Potts@gnf.com> 02/10/06 8:46 AM >>>

Ralph,

You may recall that I mentioned previously that we were looking at an alternate cladding alloy for high exposure (or earlier) applications. We are working with Mike Billone to have the unirradiated material undergo testing for LOCA, as we have discussed. The point of this note is to make you aware that we are in the process of retrieving some fuel rods at ~68 GWd/MTU bundle average exposure. The retrieved fuel rods will include the alternate alloy in addition to standard Zr-2 both at the same exposure. Would you see an interest in including these fuel rods in your ongoing program? I know it's a struggle to get done what you already have planned, but we can potentially make something available if you are interested.

With the direction you are headed, we believe the future testing requirement for new alloys will only involve unirradiated (but hydrogen doped) testing - with no requirement for irradiated cladding testing. Am I correct, and there will be no requirement for similar testing of our potential new alloy in the irradiated condition?

GAP

CC: <billone@anl.gov>