Comments from D. Harrison

I concur with the summary and conclusion stated above. The Japanese thermal test data support the qualification of NS-4-FR for temperatures below 300F. The tests support the SAR statements that less than a 2% weight loss would be expected from a 20 year service life. The primary constituent of the weight loss in NS-4-FR is from water vapor being released from the ATH. A very conservative 2% reduction in neutron attenuation capability is assumed due to the weight loss. The thermal test data was run at temperatures up to 180F (356F), for 5000 hours, with acceptable results. The NAC-STC and NAC-UMS SAR temperatures for the use of NS-4-FR are less than 300F, therefore, the material is suitable for use and there is no part 21 issue.

The radiation testing was comprehensive and substantiates that minimal degradation is expected from the neutron and gamma fluence that the NS-4-FR will experience during the cask use.

It was noted that the epoxy resin and hardener chemical product number had changed. NAC contacted the Vendor and received a written affirmation that the current product number is the identical material distributed previously and qualified.